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THE

MAGAZINE OF NATURAL HISTORY

AND

JOURNAL

OF

ZOOLOGY, BOTANY, MINERALOGY, GEOLOGY, AND METEOROLOGY.

NATURALISTS AND LOVERS OF NATURE
VOL. V.
1832.

CONDUCTED

BY J. C. LOUDON, F.L., G., & Z.S.,

MEMBER OF VARIOUS NATURAL HISTORY SOCIETIES ON THE CONTINENT.

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PREFACE.

The Magazine of Natural History, our readers, we trust, will agree with us in thinking, improves as it proceeds; and this Fifth Volume, now brought to a close, will be found to excel all that have preceded it, in the variety and interest of the communications which it contains. For this superiority we are mainly indebted to our contributors, among whom, it will be found, are not only some of the first naturalists of this country, but also others, whom this Magazine has been the means of exciting to enter on this branch of study. Our readers cannot have failed to observe that this work, as well as the *Gardener's Magazine*, has derived the greatest advantage from the industry and talent of our excellent co-editor, Mr. Denson.

In consequence of the increasing number of communications, we have, for more than a year past, contemplated the idea of publishing the work monthly; and we have solicited, from time to time, the opinion of our readers and correspondents on this subject. Our correspondents, with very few exceptions, approve of the proposed change, but we have not the same assurance from our readers generally. We have, therefore, after mature consideration, determined on continuing the work another year, at least, on the same terms of publication as heretofore.

In the Index to this Volume we have omitted what we were led to think by some of our friends would render it more complete, viz., the separate alphabets of the Queries and Answers, and of the Retrospective Criticism. We find that this gave readers a great deal of additional trouble, by obliging them, when consulting the Magazine on any particular subject, first to refer to the common alphabet, and next to the separate alphabets, under the two heads mentioned. We have, in the present Index, endeavoured to arrange every item of information so distinctly as seldom, if ever, to have two references to the same pages under different heads; a fault (as we think) common to most indexes. It has also been suggested to us that the Glossarial Index is no longer necessary; since our readers, from our preceding indexes of this kind, and also from the general spread of Natural History knowledge, as well as from all difficult terms being explained when they first occur, may now be supposed to be able to dispense with this kind of information.

Our great object, in commencing the Magazine of Natural History, and in conducting it, as well as all the other publications with which we are connected, has been, and is, to convey the greatest degree of knowledge, to the greatest number, in the most easy and agreeable manner, and with the least labour and loss of time. With this aim, we shall continue our exertions; encouraged by our past success, anxiously inviting the continued support of those who approve of our intentions, and sincerely thanking all our contributors for that able cooperation which has rendered this Magazine what it is.

J. C. L.

Bayswater, *Oct.* 1832.

CORRECTIONS.

Errors are corrected, as soon as noticed, in the division of the Magazine entitled "Retrospective Criticism," which occurs in the present volume at pp. 98. 193. 292. 393. 487. 588. 673. and 714. Besides the corrections made under this head, the following are required: —

In p. 48. last two lines, for "the cuticle of the stem and it bracteas have no perspiring pores," read "the cuticle of the stem and its bracteas has no perspiring pores."

In p. 340. line 2. from the bottom, for "the ordinary length and size," read "half the ordinary length and size:" the drawing was reduced in the engraving, and the letterpress was not altered accordingly.

In p. 390, 391, 392. for "ciliæ" read "cilia."

In p. 555. for "M.R." read "M.P."

In p. 571. line 11. for "Avícola" read "Arvícola."

In p. 589. line 18. for "collection in" read "collection of."

In p. 599. line 16. from the bottom, for "ós innominàta" read "ós innominàtum."

In p. 677. line 21. from the bottom, for "moment" read "enormous."

In Vol. III. p. 6. in Mr. Dovaston's Biography of Bewick, for "1719" read "1819."

In Vol. IV. in the Index, for "Hail in the south of France, &c., 540," read "Hail, &c., 551."

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THE MAGAZINE

OF

NATURAL HISTORY.

JANUARY, 1832.

ORIGINAL COMMUNICATIONS.

Art. I. *Remarks on the Luminosity of the Sea.* By J. E. Bowman, Esq. F.L.S.

The valuable observations of Mr. Westwood on the luminosity of the sea (Vol. IV. p. 505.), induce me to think it worth while to place on record an extract from my private journal, which illustrates the view he has taken, and may possibly assist in establishing at least one cause of this well known and beautiful phenomenon. It is as follows: — "On treading upon a tuft of tang [sea-weed] in our way down to the boat, it shot out in every direction interrupted rays of phosphoric light, like a star of artificial firework. This beautiful effect we repeatedly produced by stamping on various tufts to force out the water; and afterwards, while sitting in the boat, waiting for the ferryman, we amused ourselves by dabbling our hands and sticks in the water, which, when agitated, was more highly illuminated than I had ever before observed it. I was soon aware that the luminous matter *lay upon the surface*: for, after a little agitation and dispersion of the surface water from around my fingers, the effect was much diminished; and, when I ceased disturbing it, the light entirely disappeared. The boat swam, as it were, in a sea of liquid fire, the ripple round its sides and the dash of the oars being sometimes brilliant beyond conception, and of a bluish phosphorescent light. It would seem that the luminous matter was not equally diffused over the strait: for it varied much in intensity in different parts of the passage; and, as we approached the Caernarvonshire shore, the contact of the oars produced very little light."

This extract refers to a passage across the Menai Strait, between Garth Ferry and Bangor, in company with my friend Wilson of Warrington, about eleven o'clock in the evening of the 27th of July, 1830. The day had been very hot, the night was dark for that season, and the sea perfectly smooth and calm. I regretted that I had neither leisure nor opportunity to bring away some of the water for microscopical examination: but we had no phial at hand, and were quite exhausted with a long and difficult, though delightful, ramble over the sea rocks between Red Wharf Bay and Penmon Point, and thence to Beaumaris, along the loose sand and shingles of the coast; and were, besides, loaded with a rich harvest of plants, which required all our time and attention. But, though not then a stranger to the phenomenon, its singularly vivid appearance struck me forcibly; and I was quite convinced that the luminous matter floated, as it were, upon the surface like a thin coat of oil, for it was dispersed or repelled by the motion of a stick or the finger, and was confined to the circumference of an irregular circle around them. I can scarcely agree with Mr. Westwood that it is rendered visible by mere *contact* with the atmosphere, since it must always be in contact from its lying on the surface; yet we have abundant proof that it is only excited by disturbance. It struck me strongly, at the time, that it was elicited by *friction*, to which, I see, others have attributed it; yet it must be as sensibly alive to that agent as the iodide of nitrogen, for it was produced when I leaned over the boat and blew upon the water.

It is a well known fact, that dead fishes and Mollúsca generate phosphorescence during the incipient stages of putrefaction; and chemical experiments have ascertained that it is increased, if it be not in some way caused, by the immersion of such substances in a solution of some neutral salt. In sea water, therefore, it is probably produced by muriate of soda [common salt]; and may not its situation on the surface be explained by its uniting with the oleaginous matter disengaged from decomposing animal substances, which, in a quiescent state of the sea, would rise and float like a film? I throw this out as mere conjecture, but it may help the philosophic enquirer to solve the problem.

This luminous matter, however, which often marks the wake of a vessel in the night, and crests the waves with a splendour not their own, is certainly not the only kind of phosphorescence which the ocean exhibits. During the mild nights of summer and autumn, innumerable Medùsæ (the glowworms of the deep) may often be seen spangling its dark bosom, or lying on our shores, left by the receding wave. I can never forget with what intense delight my friend Dovaston and myself once watched them glide past us on a midnight sail from Oban to Fort William; nor how willingly, in those regions of romance, philosophy alternately resigned her sway to the brownie or the kelpie. But I think, with Mr. Westwood, these "living fires of ocean" are not the *primary* cause of the phenomenon; and that, until some direct and well-conducted experiments establish the fact that their luminosity is an inherent and essential condition of their organisation, we may suppose it to be of the nature already mentioned, which may adhere to their surface as they swim among it, or may constitute their food; and, as such, be seen through their transparent substance: and, if friction be supposed necessary to exhibit it, this condition is probably fulfilled during the process of digestion and assimilation.

One word more "on the suppositions that have been raised as to the objects of its existence." Those alluded to by your correspondent are, at least, unsatisfactory; and, as he has not given the ingenious and highly probable conjectures of Dr. Macculloch (*Description of the Western Islands*, vol. ii. p. 201.), I shall subjoin them. He supposes "the property of phosphorescence has been conferred on many fishes, and apparently in the greatest degree on the molluscous animals, whose astonishing powers of reproduction, and whose insensibility nearly approaching to vegetable life, seem to mark them as having been principally created for the supply of the more perfect tribes, to enable them to pursue their own prey, as well as for disclosing themselves to their pursuers, either during the darkness of the night, or in those deep recesses of the ocean impervious to the solar ray." He further adds:— "The luminous property of dead fish is, perhaps, calculated for similar wise ends. These, sinking to the bottom, become capable of attracting the attention of the deep-water fishes; answering the double purpose of food to these tribes, and admitting the removal, as in the air, of carcasses which might produce, even in those depths, inconveniences similar to those which bodies in a state of putrefaction cause on the surface of the earth. It is also not improbable that the desire which fishes appear to show of following luminous bodies arises from this natural instinct. Herrings are often caught in considerable abundance by a fly or any bright substance, often by new-tinned hooks, which they seize with great avidity.

J. E. Bowman.

The Court near Wrexham, Nov. 7. 1831.

ART. II. *Further Account of a Russian Natural History Expedition in Brazil, during the Seven Years preceding April,* 1831. By M. F. FALDERMANN, Curator of the Imperial Botanic Garden, St. Petersburgh.

(*Continued from* Vol. IV. p. 403.)

Sir,

IN the close of the communication which I made to you on April 18. 1831. (see Vol. IV. p. 403.), I promised to supply some account of the plants which M. Riedel brought alive from the Brazilian empire to the Imperial Botanic Garden: that promise I shall now endeavour to fulfil.

On account of M. Riedel's uncommonly quick passage (namely, in sixty-four days) from Rio de Janeiro to St. Petersburgh, above two thirds of his plants were alive on his arrival at the Botanic Garden; and, in fact, were in a considerably better state than even many plants which we received from France and Great Britain: but we must in a great measure attribute this very successful transportation, considering the great many ineligibilities and inconveniences on board a ship on such a voyage, to M. Riedel's great exertions in attending the plants over sea. We must likewise remember the kind and obliging master of the vessel Captain Kromtschenko, who came with his cargo for the imperial Russian North-west American Company, from their colonies at Sitcha, and took charge of the plants at Rio de Janeiro; for the great care and assistance he bestowed on M. Riedel and his plants, he received from the Emperor of Russia a reward of 1000 rubles bco asig. (40*l.* sterling), and it was mentioned in the public papers. I notice this only for the benefit of a great many other captains, who are usually by no means the most obliging persons to people at sea.

The following is a list of the remarkable plants we received in the autumn of the year 1830, from the Brazils, into the Imperial Botanic Garden, as collected and brought home by the botanical traveller, L. Riedel: —

*A*càcia amazónica *Riedel.*
*A*càcia, sp.
Amarýllis, sp.
*A*ristolòchia, 5 sp.
Artocárpus, sp.
A'nda brasiliénsis.
Apeìba Tiboúrbou, from the river Amazon.
Alsodèa physíphora.
*A*roídeæ, 7 sp.
Bougainvíll*ea*, sp.
Bauhín*ia*, 3 sp.
Bignòn*ia* tomentòsa *Riedel.*
Bignòn*ia*, sp. from Rio Madera.
Bignòn*ia*, 3 sp.
Bómbax, 2 species, the stems of which are extremely prickly.
Bredemèy*era*, sp.
Banistèr*ia*, 3 sp.
Begòn*ia*, 2 sp.
*C*lèthra, sp.
Comaspérmum, sp.
Coffèa, sp.
Cratæ`v*a Tàpia?*
Cassèl*ia* serràta.
*C*ássia, 3 sp.
Clùsi*a*, 2 sp.
Chiococca, sp.
Coccóloba, 5 sp.
*C*ápparis, sp.
Compósitæ, shrubby species.
Cnemidóstachys, sp.
*C*rìnum, sp.
Carolíne*a*, sp.
Cecròp*ia*, sp.
Cissámpelos, 3 sp.
*C*ústus, sp.
*C*áctus, 6 new sp.

Dichorizándra thyrsiflòra ?
Dioscòre*a*, sp.
Dorstèn*ia* Ceratosánthes.
Dorstèn*ia* *a*rifòlia.
Dorstèn*ia* *a*rifòlia, var. *β*.
Dorstèn*ia*, shrubby sp.
Dorstèn*ia*, sp.
Erythrìna, sp.
*E*chìtes, sp.
Erythróxylon, sp.
Euphòria, sp.
Eugèn*ia*, sp.
*E*uphórb*ia*, sp.
*E*upatòr*ium* *Ayapàna*
Francísc*ea* uniflòra.
*F*ìcus, 2 sp.
Fagàra, sp.
*F*ílices, 36 sp.; amongst which are 4 shrubby sp. 4 Aneìmia, 1 Maráttia, 1 Diplàzium Riedel*iànum* Fischer, *As*plènium Nìdus, Aspídium sérra *Fischer*, &c.
Galipèa, 4 sp.
Gouàn*ia*, sp.
Guàrea, sp.
Gesnèr*ia*, 3 sp.
Gómphia, sp.
Gambògia, sp.
Geoffròy*a*, 2 sp.
Gardèn*ia*, 3 sp.
Herrèr*ia* stellàta.
Ionídium, 2 sp.
Joncquèt*ia* paniculàta.
Justíc*ia*, 6 sp.
I'nga, 2 sp.
Kielmèyer*a*, sp.
*L*aúrus, sp.
Lycopòdium, sp.
Leguminòsæ, 6 sp.
Myrística *Bicaíba*.
*M*ýrtus, 8 sp.
*M*eliàceæ, sp.
Malpígh*ia*, sp.
Malpighi*àceæ* ? sp.
Mutís*ia*, sp.
Mikàn*ia*, 2 sp.
Melástoma, sp.
Márica, sp.
Magnòl*ia*, sp. (Talauma)
Mánihot, sp. (the true Cassava of South America.)
[*Janìpha Mánihot*, see *Gardener's Magazine*, vol. vii. p. 470.].
Mangífera índica ?
Maína brasiliénsis.
Noisétt*ia*, sp.
Novum genus.
Neóttia, 3 sp.
Neóttia rufèscens *Fisch*.
*O*lýra, sp.
O'xalis fruticòsa.
O'xalis Barreliè*ri*.
*O*rchídeæ, 52 sp., amongst which is a new sp. of Prescot*ia*.
Petrè*a* volùbilis.
*P*olýgala, 2 sp.
Paullín*ia*, sp.
*P*ànax, sp.
Petivèr*ia* tetrándra.
*P*sídium, 2 sp.
Pòthos, 8 sp.
Pitcaírn*ia*, 4 sp.
*P*ìper, 5 sp.
Peperòmia, 4 sp.
*R*ubiàceæ, 9 sp.
*R*héxia, 3 sp.
*R*hámneæ, 3 sp.
Rhizóphora *Mángle*.
Rollín*ia*, sp.
Roupàla, sp.
Solándr*a*, 2 sp.
Sapindàceæ, sp.
Schnéll*ia*, sp.
*S*olànum, 2 sp.
Serìan*a*, 2 sp.
*S*mìlax, sp.
Scitamíneæ, 17 species; amongst which we had lately *P*hrýnium cylíndricum in flower.
Seafórt*ia*, sp.
*T*erebintàceæ, 3 sp.
Ternstrœ`m*ia*, sp.
Theobròma *Cacào*.
Triópteris, 2 sp.
Theophrást*a*, 2 sp.
Trigònia glàbra.
Trigònia, 2 sp.
Turnèr*a*, 2 sp.
Trichília *p*teleæfòlia.
Tillándsi*a*, 12 sp.
Tradescánt*ia*, 2 sp.
Vanílla, sp.
Vellòz*ia*, 2 sp.

List of Palms brought at the same time, by M. Riedel, from the Brazils: —

Báctris *Maràja*.
Báctris acanthocárpa.
Desmóncus polyacánthus.
Geónoma élegans
Geónoma Pohl*iàna*.
Geónoma acaúlis ?
Astrocàryum acaúle
Astrocàryum *Aýri*.
Astrocàryum campéstre?
Acrocòmia sclerocárpa.
Maximiliàn*a* règia.
Diplothèmium marítimum.
Sỳagru*s* *cocoïdes* ?

The duty to which M. Riedel bound himself, during his travels in the interior of the Brazils, was, to collect for Russia, principally plants to form a Brazilian herbarium, and also as many seeds and live plants as possible for the Imperial Botanic Garden at St. Petersburgh. The principal of the conditions of his engagement was, to have a certain share of the whole collection of dried plants. By this means he obtained a considerable herbarium of his own; and this, added to the collection which he made at his own expense in the province of Bahia, before he entered the service of Russia, gave him altogether a herbarium of about 8000 species of Brazilian plants, and nearly 60,000 specimens. This very rich and interesting herbarium M. Riedel offered, on his arrival at St. Petersburgh, to the museum of the Imperial Botanic Garden, where it is at present deposited, for the use of science. The Emperor Nicholas has been pleased to grant him the sum of 12,000 rubles banc. asig. (480*l.* sterling), for his great exertions and indefatigable perseverance during the time of his travels for the Russian government; and the emperor has also conferred on him the rank of a captain in the Russian service. This gracious mark of distinction from the sovereign will be of great service to him in his further travels at the Brazils, that being a country where people of government distinction are in general more respected.

M. Riedel remained during the winter at the Imperial Botanic Garden, arranging his herbarium for the museum of that establishment.

On the 14th of February, 1831, an order was signed by the Emperor Nicholas, consisting of the following articles: —

"I. That the botanist L. Riedel shall be attached to the Imperial Botanic Garden, and shall depart immediately again to the Brazils, to collect there, for the said establishment, principally live plants, of all scarce and new kinds; also a herbarium, and any thing belonging to natural history.

"His appointment, as long as he shall travel at the Brazils, shall be each year 5000 rub. bco. asig.; and after his return to St. Petersburgh to be employed at the garden for the salary of 3000 rub. bco. asig. annually.

"II. He shall receive for the voyage from St. Petersburgh to the Brazils, from the cabinet of His Imperial Majesty 500 ducats.

"III. He shall receive the sum of 5000 rubles bco. asig. annually, for the expenses of travelling in the forementioned country.

"He shall receive the sum of 6000 rub. bco. asig. at once, to buy instruments, maps, books, and all things necessary for his journey into the Brazils.

"He shall have 5000 rubles bco. asig., to buy, at Rio de Janeiro, three slaves to attend him on his excursions; and shall receive an annual sum of 900 rubles bco. asig. for their maintenance.

"IV. A painter from the Imperial Academy of Arts, and a gardener from the Imperial Botanic Garden, shall be joined to M. Riedel, and the first vessel going to the Brazils shall take them there.

"V. The money to maintain the aforesaid shall be taken from the funds of the Imperial Botanic Garden; and, in case it should not suffice, it shall be reported to the minister of His Imperial Majesty's court, who shall draw the necessary sums from the cabinet of the Emperor.

"The expedition shall be under the general direction and control of Dr. Fischer, the director of the Imperial Botanic Garden, who shall receive all the collections for that establishment, and who has to report on them, as well as on the further proceedings of the travellers, to the minister of this Imperial court."

According to that most noble order of the Emperor, M. Riedel left St. Petersburgh in the beginning of March, 1831, and is now on his way to the Brazils. He proposed to himself to go first to London, to buy there some of the necessary books, maps, instruments, &c., for the use of his new voyage; but I have since received letters from M. Riedel, informing me that he had made his preparations at Hamburgh, and started thence direct to the Brazils, where, no doubt, he will by this time have safely arrived.

It is proposed that the painter shall attend M. Riedel on his travels in the interior of the Brazils, but that the gardener shall remain at Rio de Janeiro, to receive the plants and seeds which will be sent by M. Riedel out of the interior parts of the country; and it is to be the gardener's business to cultivate the plants, and prepare them for shipping. He is charged to send, by every opportunity, to St. Petersburgh, boxes of plants, herbariums, collections of different species of wood, seeds, &c.; but the main collection of the more rare plants, particularly of palms, is to remain at Rio de Janeiro, and to be eventually brought over, under the especial care of the above-mentioned gardener.

We now, therefore, entertain hopes of receiving a good many of those plants which we at present so much admire in the books descriptive of that rich country, from the pens of some noted travellers. Under such promising circumstances, we may have one day the pleasure to see some of the enormous stoves of the Imperial Botanic Garden filled with a beautiful Brazilian vegetation. No doubt they will prosper, as many of the Brazilian and other tropical plants already in the establishment, under the 59th degree of northern latitude, thrive uncommonly well; and, although the garden has only been about nine years in existence, we have gathered already fruits of several Eugèn*iæ*, *Jambòsæ*, Uvàriæ, Mùs*æ*, *P*sídia, Euphòriæ, Xanthochŷmus, Chrysophŷlla, Stercùlia nóbilis, Sarcocéphalus esculéntus, *C*innamòmum dùlce, &c.

I hope subsequently to be able to give you some further relations of the proceedings of M. Riedel at the Brazils; and remain, dear Sir, your most obedient servant,

F. FALDERMANN.

Imperial Botanic Garden, St. Petersburgh,
August 10. 1831.

PARAGUAY Tea, and the Tea Tree of Paraguay, the I'lex paraguaiénsis, of the botanist St. Hilaire. (*fig.* 1.) — In M. Faldermann's interesting communication (in Vol. IV. p. 394—403.) on the plants of Brazil, mention is several times made of the tea tree of Paraguay. On this account we beg to present the following interesting extract, relating to it, which is taken from the fourth volume of the *Seminario de Buenos Ayres* of Azara. M. Faldermann remarks (p. 401.) that it should be spelled tea of Paraquay, and I'lex paraquaiénsis; but this may be deemed doubtful out of Russia, where q and g are said to be often convertible: —

1

"The tea tree of Paraguay, called in the country yerva mate, is one of the most useful trees in Paraguay, to which it is nearly peculiar. It is found growing spontaneously, intermingled with the other native trees, in the forests which cover the banks of the rivers and streams which fall into the Parana and Uruguay, as well as the sources of the rivers Ipane and Jejui. The tree is large, and often equals in size the common orange tree; but in the places where the leaf is regularly gathered, it becomes stunted, from the limbs being cut every two or three years, but not oftener, owing to an opinion that this time is requisite to season the leaves, which do not fall off in winter. The trunk is about a foot in diameter; the bark is smooth and whitish; the boughs, which spring upwards like those of the laurel, are leafy and tufted. The leaf is elliptic, cuneiform, from 4 to 5 in. long; thick, glossy, crenated, of a dark green above, and paler below. The petiole is of a dark red, and half an inch long. Its flowers are produced in umbels of thirty or forty flowers each, with four petals, with the same number of stamens. The berry is red, very smooth, and of the size of a small pea.

"The method of preparing the leaves is as follows: — A hurdle of long poles is constructed, in the form of a cylindrical vault, which they call barbaqua; under this a large fire is made, and the branches being placed on the hurdle remain there till the leaves are sufficiently dry. After this they remove the fire; and on the hard and hot platform, after being swept clean, they throw the branches, which they beat to separate the leaves. In this each is assisted by a boy, called a quayno, who receives the proportion of 25 lbs. of leaves for every bundle of branches he cleans.

"The leaves being separated from the branches, and prepared sufficiently, are next put into a large bag made of hides, which has the four upper corners fixed to four large stakes placed in the ground, fitted to support a considerable weight; into this they put the leaves, and beat them down with a pole, in the same way as the negroes of the West Indies pack their cotton bags. When the bag is filled and packed hard, the mouth is sewed up; and in this state, without farther preparation, the leaves are fit for use, but not considered as seasoned till they are a few months old.

"We find, in the beginning of the seventeenth century, that this plant was in common use throughout Paraguay; and there can be no doubt but the Indians of Monday taught it to the conquerors, from their being the natives who lived in the vicinity of the forests. The quantity used by a person who is fond of it is an ounce. The amount daily gathered by a labourer is from four to twelve, and sometimes more, arrobas. There are among the creoles or mestizoes many who falsely charge the Paraguayans with having exterminated the Indians by making them work at this labour.

These leaves are used in Paraguay, La Plata, Peru, and Quito, at all hours of the day, by putting a handful into a kind of tea-pot called mate (which has given its name to the herb), and from the spout of this the hot liquid is imbibed. Some mix sugar with it, and others add a few drops of lemon juice; and by pouring fresh boiling water the infusion may be renewed. 200,000 arrobas, equal to five millions of pounds, are annually obtained from Paraguay, 110 arrobas of which go to Chile, whence Lima and Quito are supplied; the rest is expended in the viceroyalty of Buenos Ayres." (*Sem. de Buenos Ayres.*)

" There are three kinds of it in its prepared state, though produced but by one plant. Caa is the distinctive Indian appellation of the plant; and the three sorts are called caa-cuys, caa-mini, and caa-guazu, the last being denominated by the Spaniards yerva de palos. The people of South America attribute innumerable virtues to this plant. It is certainly aperient and diuretic; but the other qualities ascribed to it are doubtful. Like opium, it produces some singular and contrary effects: it gives sleep to the restless, and spirit to the torpid. Those who have once contracted the habit of taking it, do not find it an easy matter to leave it off, or even to use it in moderation; though, when taken to excess, it brings on similar disorders to those which are produced by the immoderate use of strong liquors." (*Wilcocke's History of Buenos Ayres*, p. 494.)

A doubt has been expressed whether the *I*ˋlex, which M. Riedel observed to prevail in Brazil in various places, and which he denominates *I*ˋlex paraguaiénsis, may not rather be a species nearly allied to, but still distinct from, that, and be the species which Dr. Martius has denominated *Cassine Gongónha*, but which Mr. David Don has more accurately denominated *I*ˋlex *Gongónha*.* This is, however, a question in systematic botany. In a popular view, it may be remarked that, as M. Riedel shows (Vol. IV. p. 401.) both *I*ˋlex paraguaiénsis and *I*ˋlex *Gongónha* to occur in Brazil, and also an additional species indicated by the name *I*ˋlex nova species, the former two, and possibly all three, species are equally applied or applicable to the supplying of that welcome beverage, tea. While on this subject, it may not be amiss to notice, incidentally,

The Plants employed as Tea in different Countries: — In Mexico, Psoràlea (?) glandulòsa; in New Granada, Alstòn*ia theæ*fórmis (*Mutis*), which is said to be equal to the tea of China; in North America, Gualthèr*ia* procúmbens and *L*èdum latifòlium; in Paraguay, *I*ˋlex paraguaiénsis and *I*ˋlex *Gongónha;* in New Holland, Corræ*ˋa* álba; in Kamtschatka, *P*ediculàris lanàta; in China, Caméll*ia Bohèa* and víridis, mixed with the leaves of C. *Sasánqua*, or oleífera, and sometimes with those of *O*ˋlea fràgrans. (*Don, in Lambert's Genus* Pìnus, *and in Jameson's Journal.*)

ART. III. *The Habits of the Barn Owl* (Stríx *flámmea* L., *Alùco flámmeus* Fleming), *and the Benefits it confers on Man.* By

CHARLES WATERTON, Esq.

THIS pretty aerial wanderer of the night often comes into my room; and after flitting to and fro, on wing so soft and silent that he is scarcely heard, he takes his departure from the same window at which he had entered.

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* From Dr. Walsh's *Notices of Brazil* (vol. ii. p. 172.) we learn that the town of Congonhas do Campo, seated at the base of Congonhas, a rugged ridge of rocky mountains piled up to the clouds, and also the Rio das Congonhas, a considerable stream about thirty yards across, derive their name from the abundance of the congonha plant found there. It is used universally as tea. " It grows in marshy places, and Patricio, my Indian guide, brought me some branches of it from the banks of the river. It attains the size of an orange tree, and has somewhat of its air and aspect. The leaves are dried, or rather roasted, on twigs before the fire, where they crackle like laurel, and are then reduced nearly to powder, and kept in pots. It is used sometimes as a hot and sometimes as a cold infusion. I have drunk it prepared in three ways: either an infusion of the fresh leaves, or made with the dried leaves like China tea, or boiled with sugar and then drained off. The clear infusion exactly resembles that of common green tea; but it is insipid, and has nothing of its flavour or odour, nor, as far as my feelings warranted me to say, of its exhilarating or refreshing quality."

I own I have a great liking for this bird; and I have offered it hospitality and protection on account of its persecutions, and for its many services to me, — I say services, as you will see in the sequel. I wish that any little thing I could write or say might cause it to stand better with the world at large than it has hitherto done: but I have slender hopes on this score; because old and deep-rooted prejudices are seldom overcome; and when I look back into the annals of remote antiquity, I see too clearly that defamation has done its worst to ruin the whole family, in all its branches, of this poor, harmless, useful friend of mine.

Ovid, nearly two thousand years ago, was extremely severe against the owl. In his *Metamorphoses* he says: —

" Fœdaque fit volucris, venturi nuncia luctus,
Ignavus bubo, dirum mortalibus omen." *

In his *Fasti* he openly accuses it of felony: —

" Nocte volant, puerosque petunt nutricis egentes." †

Lucan, too, has hit it hard:—

" Et lætæ jurantur aves, bubone sinistro:" ‡

and the Englishman who continued the *Pharsalia* says —

" Tristia mille locis Stygius dedit omina bubo." §

Horace tells us that the old witch Canidia used part of the plumage of the owl in her dealings with the devil: —

" Plumamque nocturnæ strigis. " ||

Virgil, in fine, joined in the hue and cry against this injured family: —

" Solaque culminibus ferali carmine bubo
Sæpe queri, et longas in fletum ducere voces." ⊥

In our own times we find that the village maid cannot return home from seeing her dying swain, without a doleful salutation from the owl: —

" Thus homeward as she hopeless went,
The churchyard path along,
The blast grew cold, the dark owl scream'd
Her lover's funeral song."

Amongst the numberless verses which might be quoted

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* " Ill-omen'd in his form, the unlucky fowl,
Abhorr'd by men, and call'd a screeching owl." *Garth's Trans.*

† " They fly by night, and assail infants in the nurse's absence."

‡ " Even the ill-boding owl is declared a bird of good omen."

§ " The Stygian owl gives sad omens in a thousand places."

|| " A feather of the night owl."

⊥ ——— " And, on her palace top,
The lonely owl with oft repeated scream
Complains, and spins into a dismal length
Her baleful shrieks." *Trapp's Translation.*

against the family of the owl, I think I only know of one little ode which expresses any pity for it. Our nursery maid used to sing it to the tune of the Storm, "Cease rude Boreas, blust'ring railer." I remember the first two stanzas of it: —

"Once I was a monarch's daughter,
And sat on a lady's knee;
But am now a nightly rover,
Banish'd to the ivy tree.

Crying, hoo hoo, hoo hoo, hoo hoo,
Hoo hoo hoo, my feet are cold!
Pity me, for here you see me,
Persecuted, poor, and old."

I beg the reader's pardon for this exordium. I have introduced it, in order to show how little chance there has been, from days long passed and gone to the present time, of studying the haunts and economy of the owl, because its unmerited bad name has created it a host of foes, and doomed it to destruction from all quarters. Some few, certainly, from time to time, have been kept in cages and in aviaries. But nature rarely thrives in captivity, and very seldom appears in her true character when she is encumbered with chains, or is to be looked at by the passing crowd through bars of iron. However, the scene is now going to change; and I trust that the reader will contemplate the owl with more friendly feelings, and quite under different circumstances. Here, no rude schoolboy ever approaches its retreat; and those who once dreaded its diabolical doings are now fully satisfied that it no longer meddles with their destinies, or has any thing to do with the repose of their departed friends. Indeed, human wretches in the shape of body-snatchers seem here in England to have usurped the office of the owl in our churchyards; "et vendunt tumulis corpora rapta suis."*

Up to the year 1813, the barn owl had a sad time of it at Walton Hall. Its supposed mournful notes alarmed the aged housekeeper. She knew full well what sorrow it had brought into other houses when she was a young woman; and there was enough of mischief in the midnight wintry blast, without having it increased by the dismal screams of something which people knew very little about, and which every body said was far too busy in the churchyard at night-time. Nay, it was a well-known fact, that if any person were sick in the neighbourhood, it would be for ever looking in at the window, and holding a conversation outside with somebody, they did not know whom. The gamekeeper agreed with her in every thing she said on this important subject; and he always stood better in her books when he had managed to shoot a bird of this bad and mischievous family. However, in 1813, on my return from the wilds of Guiana, having suffered myself, and learned mercy, I broke in pieces the code of penal laws which the knavery of the gamekeeper and the lamentable ignorance of the other servants had hitherto put in force, far too successfully, to thin the numbers of this poor, harmless, unsuspecting tribe. On the ruin of the old gateway, against which, tradition says, the waves of the lake have dashed for the better part of a thousand years, I made a place with stone and mortar, about 4 ft. square, and fixed a thick oaken stick firmly into it. Huge masses of ivy now quite cover it. In about a month or so after it was finished, a pair of barn owls came and took up their abode in it. I threatened to strangle the keeper if ever, after this, he molested either the old birds or their young ones; and I assured the housekeeper that I would take upon myself the whole responsibility of all the sickness, woe, and sorrow that the new tenants might bring into the Hall. She made a low courtesy; as much as to say, "Sir, I fall into your will and pleasure:" but I saw in her eye that she had made up her mind to have to do with things of fearful and portentous shape, and to hear many a midnight wailing in the surrounding woods. I do not think that, up to the day of this old lady's death, which took place in her eighty-fourth year, she ever looked with pleasure or contentment on the barn owl, as it flew round the large sycamore trees which grow near the old ruined gateway.

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* "And sell bodies torn from their tombs."

When I found that this first settlement on the gateway had succeeded so well, I set about forming other establishments. This year I have had four broods, and I trust that next season I can calculate on having nine. This will be a pretty increase, and it will help to supply the place of those which in this neighbourhood are still unfortunately doomed to death, by the hand of cruelty or superstition. We can now always have a peep at the owls, in their habitation on the old ruined gateway, whenever we choose. Confident of protection, these pretty birds betray no fear when the stranger mounts up to their place of abode. I would here venture a surmise, that the barn owl sleeps standing. Whenever we go to look at it, we invariably see it upon the perch bolt upright, and often with its eyes closed, apparently fast asleep. Buffon and Bewick err (no doubt, unintentionally) when they say that the barn owl snores during its repose. What they took for snoring was the cry of the young birds for food. I had fully satisfied myself on this score some years ago. However, in December, 1823, I was much astonished to hear this same snoring kind of noise, which had been so common in the month of July. On ascending the ruin, I found a brood of young owls in the apartment.

Upon this ruin is placed a perch, about a foot from the hole at which the owls enter. Sometimes, at midday, when the weather is gloomy, you may see an owl upon it, apparently enjoying the refreshing diurnal breeze. This year (1831) a pair of barn owls hatched their young, on the 7th of September, in a sycamore tree, near the old ruined gateway.

If this useful bird caught its food by day, instead of hunting for it by night, mankind would have ocular demonstration of its utility in thinning the country of mice, and it would be protected and encouraged every where. It would be with us what the ibis was with the Egyptians. When it has young, it will bring a mouse to the nest about every twelve or fifteen minutes. But, in order to have a proper idea of the enormous quantity of mice which this bird destroys, we must examine the pellets which it ejects from its stomach in the place of its retreat. Every pellet contains from four to seven skeletons of mice. In sixteen months from the time that the apartment of the owl on the old gateway was cleaned out, there has been a deposit of above a bushel of pellets.

The barn owl sometimes carries off rats. One evening I was sitting under a shed, and killed a very large rat, as it was coming out of a hole, about ten yards from where I was watching it I did not go to take it up, hoping to get another shot. As it lay there, a barn owl pounced upon it, and flew away with it.

This bird has been known to catch fish. Some years ago, on a fine evening in the month of July, long before it was dark, as I was standing on the middle of the bridge, and minuting the owl by my watch, as she brought mice into her nest, all on a sudden she dropped perpendicularly into the water. Thinking that she had fallen down in epilepsy, my first thoughts were to go and fetch the boat; but before I had well got to the end of the bridge, I saw the owl rise out of the water with a fish in her claws, and take it to the nest. This fact is mentioned by the late much revered and lamented Mr. Atkinson of Leeds, in his *Compendium*, in a note, under the signature of W., a friend of his, to whom I had communicated it a few days after I had witnessed it.

I cannot make up my mind to pay any attention to the description of the amours of the owl by a modern writer; at least the barn owl plays off no buffooneries here, such as those which he describes. An owl is an owl all the world over, whether under the influence of Momus, Venus, or Diana.

When farmers complain that the barn owl destroys the eggs of their pigeon, they lay the saddle on the wrong horse. They ought to put it on the rat. Formerly I could get very few young pigeons till the rats were excluded effectually from the dovecot. Since that took place, it has produced a great abundance every year, though the barn owls frequent it, and are encouraged all around it. The barn owl merely resorts to it for repose and concealment. If it were really an enemy to the dovecot, we should see the pigeons in commotion as soon as it begins its evening flight; but the pigeons heed it not: whereas, if the sparrowhawk or windhover should make their appearance, the whole community would be up at once, proof sufficient that the barn owl is not looked upon as a bad, or even a suspicious, character by the inhabitants of the dovecot.

Till lately, a great and well-known distinction has always been made betwixt the screeching and the hooting of owls. The tawny owl is the only owl which hoots; and when I am in the woods after poachers, about an hour before daybreak, I hear with extreme delight its loud, clear, and sonorous notes, resounding far and near through hill and dale. Very different from these notes is the screech of the barn owl. But Sir William Jardine informs us that this owl hoots; and that he has shot it in the act of hooting. This is stiff authority; and I believe it because it comes from the pen of Sir William Jardine. Still, however, methinks that it ought to be taken in a somewhat diluted state; we know full well that most extraordinary examples of splendid talent do, from time to time, make their appearance on the world's wide stage. Thus, Franklin brought down fire from the skies:—" Eripuit fulmen cœlo, sceptrumque tyrannis."* Paganini has led all London captive, by a single piece of twisted catgut:—" Tu potes reges comitesque stultos ducere."† Leibnitz tells us of a dog in Germany that could pronounce distinctly thirty words. Goldsmith informs us that he once heard a raven whistle the tune of the " Shamrock," with great distinctness, truth, and humour. With these splendid examples before our eyes, may we not be inclined to suppose that the barn owl which Sir William shot in the absolute act of hooting may have been a gifted bird, of superior parts and knowledge (una de multis ‡, as Horace said of Miss Danaus), endowed, perhaps, from its early days with the faculty of hooting, or else skilled in the art by having been taught it by its neighbour, the tawny owl? I beg to remark, that though I unhesitatingly grant the faculty of hooting to this one particular individual owl, still I flatly refuse to believe that hooting is common to barn owls in general. Ovid, in his sixth book *Fastorum*, pointedly says that it screeched in his day: —

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* " He snatched lightning from heaven, and the sceptre from tyrants."

† " Thou canst lead kings and their silly nobles."

‡ " One out of many."

> " Est illis strigibus nomen; sed nominis hujus
> Causa, quod horrendâ stridere nocte solent." *

The barn owl may be heard shrieking here perpetually on the portico, and in the large sycamore trees near the house. It shrieks equally when the moon shines and when the night is rough and cloudy; and he who takes an interest in it may here see the barn owl the night through when there is a moon; and he may hear it shriek when perching on the trees, or when it is on wing. He may see it and hear it shriek, within a few yards of him, long before dark; and again, often after daybreak, before it takes its final departure to its wonted resting place. I am amply repaid for the pains I have taken to protect and encourage the barn owl; it pays me a hundred-fold by the enormous quantity of mice which it destroys throughout the year. The servants now no longer wish to persecute it. Often, on a fine summer's evening, with delight I see the villagers loitering under the sycamore trees longer than they would otherwise do, to have a peep at the barn owl, as it leaves the ivy-mantled tower: fortunate for it, if, in lieu of exposing itself to danger, by mixing with the world at large, it only knew the advantage of passing its nights at home; for here

> " No birds that haunt my valley free
> To slaughter I condemn;
> Taught by the Power that pities me,
> I learn to pity them."

CHARLES WATERTON.

Walton Hall, November 26. 1831.

ART. IV. *Fishes new to the British Fauna, contained in Couch's " History of the Fishes of Cornwall."* By JONATHAN COUCH, Esq. F.L.S. &c.

MIDGE (CILIA'TA GLAU'CA); Class II. *Jugular Fishes.*

THE Midge (*fig.* 2.) is about 1½ in. in length; the body moderately elongated, the proportions much resembling those of the whiting; head obtuse; upper jaw longest, having four barbs, the under jaw one; teeth in both jaws; gill membrane with seven rays; eye large and bright; pectoral and ventral fins rather large for the size of the fish; a ciliated membrane placed in a chink behind the head; the dorsal and anal fins reach almost to the tail, which is large and straight; scales deciduous; colour on the back a bluish green, belly and fins silvery.

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* " They are called owls (striges), because they are accustomed to screech (stridere) by night."

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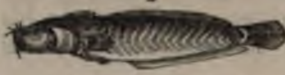

Sp. Ch. Back bluish green, all besides silvery, five barbs. *C.*

It is the mackarel midge of our fishermen, to whom it is well known, though hitherto unnoticed by naturalists. For brevity's sake, I have retained only the name Midge, which is probably descriptive of its minute size; being the smallest fish I have any knowledge of.* Compared with the minnow, it is minute; and, placed by the side of the mighty whale, —

> " That sea-beast, which God of all his works
> Created hugest, that swim the ocean stream;
> Him haply slumbering on the Norway foam,
> The pilot of some small night-founder'd skiff
> Deeming some island,"——

it seems to illustrate the creative energy of that Being in whom all live and move; for these also " are his offspring."

It may, perhaps, be the fish alluded to by Ray (*Syn. Pisc.*, p. 165.), and seems to be one of the many spoken of by the older naturalists under the name of *A'*pua. From their minute size, and the multitudes in which they sometimes appear, they judged them produced by spontaneous generation from the froth of the sea or the putrefaction of marine substances.

This species is gregarious and migratory, making its first appearance about the middle of May. Through the summer, and particularly in fine weather, they are in considerable numbers, swimming near the surface, when they are followed by mackarel and pollacks, and other fish, which devour multitudes of them. When winter approaches, they disappear; but it can scarcely be supposed that they go to a great distance.

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* The word midgein means a very small quantity, in common language, in Cornwall. I find also the word midge used for a gnat in Hawkins's edition of *Walton's Angler*, part ii. p. 104.

SPANISH BREAM (*SPA'RUS L. ERY'THRINUS C.*); Class III. *Thoracic Fishes.*

This species (*fig.* 3.) bears a great resemblance to the sea bream, and will best be described in comparison with it. It

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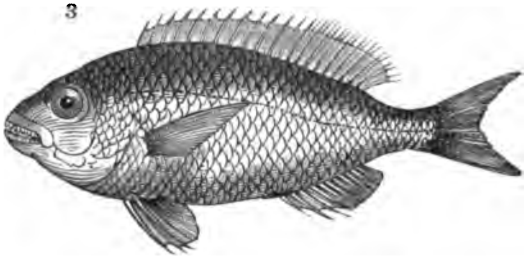

is the size of a small bream; the body rather more slender; head flatter on the top; eyes smaller, inclining to oval. Before the eye the head is more protruded; the mouth with a wider gape. Front teeth as in the bream; grinders more broad and blunt; scarcely a depression before the eyes to receive the nasal orifices, though in the bream they are conspicuous; fins as in the bream, even to the numbers of the rays, except the pectoral, which in the bream reaches opposite to the third ray of the anal fin; in this fish, opposite only to the vent. There is no lateral spot. This description agrees so well with what Ray delivers of the *Erýthrinus* (*Syn. Pisc.*, p. 132.), that I suppose it to be the same fish.

The name given above is that by which it is known to our fishermen. It is rare, as I have never seen above two or three specimens. Its habits seem to be like those of the bream.

CORKWING (*LA'BRUS L. GI'BBUS L.*); Class III. *Thoracic Fishes.*

This species (*fig.* 4.) is about three times as long as it is broad, and much compressed; jaws equal, mouth narrow,

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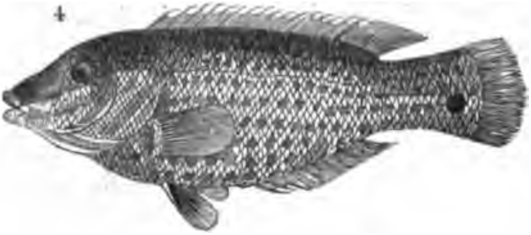

gape small, teeth regular; first plate of the gill covers serrate, gill membrane with five rays; large scales on the head and body; lateral line nearer the [illegible]ing down suddenly opposite the termination o[illegible] fin. Pectoral fin round, with fourteen rays; dorsal fin with sixteen firm and nine soft rays; ventrals close together, with six rays, the outermost firm; anal fin with three firm and nine soft rays, the last two from one root; tail slightly rounded, with fourteen rays. Colour of the head and summit of the back brownish; stripes of red and green on the gill covers; sides a faint green with numerous lightish red stripes. The fins are similarly variegated, but all the colours, though subject to variety as in others of this genus, are fainter than in most others. Near the tail, close to the termination of the lateral line, is a conspicuous black mark, which is sometimes wanting; and then it seems to me to constitute the gibbous wrass of British naturalists, which is therefore only a variety of the above. The iris of the eye is marked with yellow, green, and crimson, in concentric circles. It rarely exceeds 4 in. in length.

The corkwing is common among rocks in shallow water, where it seeks shelter among the sea-weeds; it is often found among them in pools left by the tide. It feeds on crustaceous animals, and takes a bait.

WRASS (*La'brus Lin.* lu'scus, *Lin.* ?).

This specimen (*fig.* 5.) was 22 in. long, the greatest depth, exclusive of the fins, 2¼ in., the body plump and rounded.

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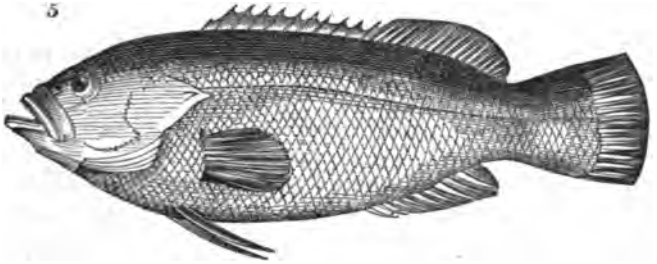

Head elongated, lips membranous, teeth numerous, in several rows, those in front larger and more prominent, rather incurved. Eye moderately large. Anterior gill plate serrate, six gill rays. Body and gill covers with large scales. Lateral line nearer the back, descending with a sweep opposite the termination of the dorsal fin, thence backward straight. Dorsal fin, twenty-one firm, eight soft rays, the fin connected with the latter expanded, reaching to the base of the tail; pectorals round, fourteen rays; ventrals six rays, the outermost simple, stout, firm, tipped; between these fins a large scale. Anal fin, six firm, eight soft rays, the latter a soft portion expanded. Tail round, fifteen rays. Between each ray of the dorsal, anal, and caudal fins is a process formed of firm elongated imbricated scales. Colour a uniform light brown, lighter on the belly; upper eyelid black; at the edge of the base of the caudal fin a dark-brown spot. Pectorals yellow, all the other fins bordered with yellow.

I have never seen more than one specimen of this species; which was taken with a line, in February, 1830, at the conclusion of a very cold season. It differs from the common wrass and corkwing in its more elongated form and rounder make; from the former also in its serrated gill cover. From the rock-cook and goldsinny it may be distinguished, besides in its larger size, by its longer form, larger mouth, rounder tail, and by the spot at the root of the tail being farther behind. The eye is larger than in the cook, and nearer the angle of the mouth; it may also be distinguished by the serrated gill cover, form of the lateral line, by more numerous tipped dorsal and anal spines, less rounded tail; as well as by the colours, which are sober, whereas those of the cook are always splendid, and are little subject to variety, except of distribution. From all the species with which I am acquainted, it may be readily known by the singular imbricated process of scales between the rays of the fins. I find some difficulty in referring it to any described species; but it seems to me to approach most closely to the *L*àbrus lúscus of Linnæus.

HOG WRASS (*LA'BRUS SUI'LLUS L.*).

Dorsal fin filamentous, above the tail a black spot; dorsal spines nine. Osbeck is my only authority for introducing this species among Cornish fishes. When on his voyage from the East, the people of the Scilly Islands brought it, among other fishes, on board of his ship for sale. (*Osbeck's Voyage*, vol. ii. p. 122.) The English name I have assigned it is merely a translation of the Linnæan term.

SMOOTH PERCH (*PE'RCA L. CHA'NNUS C.*); Class III. *Thoracic Fishes.*

I had long unavailingly sought for a satisfactory account of this species in the books on natural history to which I was able to procure access, when I had unexpectedly the good fortune to discover it in Gesner (*Nomenclator Aquat. Anim.*, p. 27.), under the name of Chánnus, or Chánna; his figure and account being strikingly applicable to this fish in a peculiarity I had remarked before I was attracted by the note in this ancient author, from which, indeed, the name is derived. "Channa piscis moriens perpetuo hiat, ac rictum edit." * As the *Chánnus*, or *Chánna*, of Gesner is unquestionably the *Chánna* of Ray (*Syn. Pisc.*, p. 140.), it is the *Làbrus Chánnus* of Turton, though it possesses none of the characters of a wrass. It must, therefore, be denominated *Pérca Chánnus.*

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* "The Channa, whilst dying, perpetually gasps and eructs."

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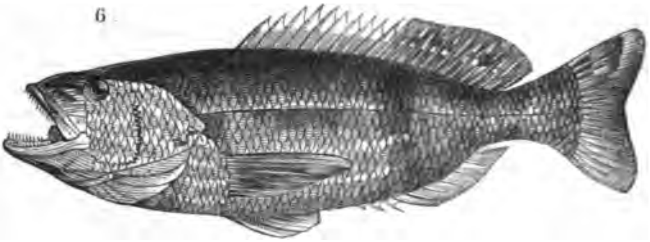
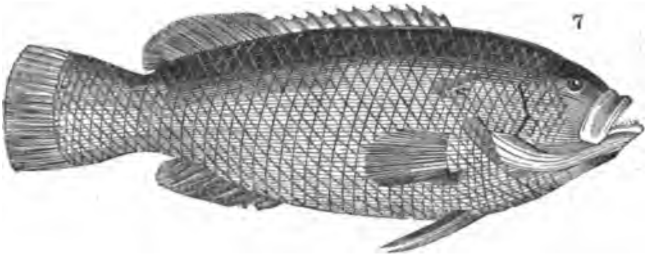


This fish (*fig.* 6.) is about 10 in. long. Under jaw longest; teeth in both and in the palate, numerous, irregular, sharp, incurved; tongue small, loose. Eyes large, near the top of the head. First plate of the gill covers serrate, the second with two (in the female, one) obscure spines, scarcely to be distinguished, except in form, from the scales with which the gill covers and body are thickly and firmly covered, and which are also ciliated. Seven rays in the gill membrane, curved, the superior broad. Body compressed, deep; the dorsal fin commences opposite the ventral, ten sharp and fourteen soft rays; pectoral fin ending in a point, fifteen rays; ventrals with six rays; anal with two pointed and seven soft rays; caudal fin slightly curved, seventeen rays. Lateral line nearer the back. Colour of the back brown, in some specimens having distinct bars running round to the belly; sides yellow, reddish or saffron-coloured, more faint below; two irregular parallel whitish lines pass along the side from head to tail; a third, more imperfect, on the belly. On the gill plates are several faintish blue stripes, running obliquely downward. The fins are striped longitudinally with red and yellow, pectorals wholly yellow.

I have suspected this to be the *P.* diagrámma *Lin.*, comparing his specific character with the description of that species given by Gronovius; but I feel some doubt, since the latter is spoken of as inhabiting Indian rivers. Until this obscurity was removed by discovering its name in Gesner's *Nomenclator Aquat. Anim.*, p. 27., as noticed above, I had ventured to name it *P.* inérmis. It is the comber of our fishermen; but this name having been irrecoverably assigned to a species of wrass, I am compelled to affix a name of my own invention, viz. smooth perch. It is a common fish, and keeps in the neighbourhood of rocks, not far from land. It is singular that the spasm which seizes this fish, when taken, never passes off; hence it is found long after death in a state of rigidity and contortion, with the fins preternaturally erect.

Dusky Perch (*Pe'rca L.* robu'sta *C.*).

The fish (*fig.* 7.) from which my description was taken weighed sixteen pounds, and measured 3 ft. in length, and 7 in. in depth, exclusive of the fins, the body thick and solid. Under jaw longest, both, as well as the palate, having numerous slender incurved teeth; in front of the under jaw was a bed of them. Lips like those of the codfish, two large open nasal orifices, and a large hole under the projection of the nasal bone. First plate of the gill covers serrate, the second with a broad flat spine projecting through the skin, and pointing backward; the fleshy covering of the gill covers elongated posteriorly; seven rays in the gill membrane. Body and head covered with large scales, lateral line gently curved. Dorsal fin single, long, expanding towards its termination, with eleven spinous rays, the first short, and seventeen soft rays, the two last from one origin. Pectoral fin round, nineteen rays; ventrals fastened down by a membrane through part of their course, six rays. Vent an inch and a half from the origin of the anal fin, which fin has two spinous and nine soft rays, the last two from one origin. Tail roundish, sixteen rays. Colour of the back reddish brown, lighter on the belly; two slightly marked lines on the gill covers running obliquely downward, one on each plate. The gill covers are not ridged. In its aspect this fish has some resemblance to the *Làbri*, yet it has none of the generic characters by which these fishes are distinguished. That it should be placed among the perches I make no question; but my most industrious search has not been able to find that it has been either figured or described: until, therefore, some other naturalist shall be more fortunate, I venture to denominate it *P.* robústa, from its great size and strength. I have never seen more than one specimen, which was taken with a line.



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BURACO DE VELHA, Gen. ?

This fish is 12 or 14 in. long, and 4 in. wide; from the head the back is elevated and arched; the head itself sharp, in each jaw a row of very small teeth. The lower part of the mouth and tongue a bright red, iris of the eye gold and dusky. A single dorsal fin, the first rays firm, the posterior flexile; tail forked; scales moderate, silvery, bluish from the head along the back; lateral line white. (*Ray*, *Syn. Pisc.*, p. 134.)

I am uncertain whether this fish is rightly arranged among the *Pércæ*; and unfortunately I was prevented from examining a species that was taken at Looe a few years since, of which I received an account from that place. This is probably the only instance of its having ever visited the British seas.

SPANISH MACKAREL (*SCO'MBER L.* MACULA'TUS *C.*); Class III. *Thoracic Fishes.*

This fish (*fig.* 8.) attains the weight of four or five pounds; but the specimen described measured no more than 14½ in. in length, the figure round and plump, 6½ in. in compass near the pectoral fins, the thickness of its figure being carried far towards the tail. Mouth large, jaws of equal length, teeth small, tongue movable and pointed. Head large and long; eye large, 1⅛ in. from the snout, and itself $\frac{6}{8}$ in. wide; from the snout to the pectoral fin 3½ in. Rays of the gill membrane six, concealed. Lateral line at first slightly descending, then straight. Scales on the superior plate of the gill covers, as well as on the body. First dorsal fin in a chink, seven rays, the first shorter, second and third of equal lengths; spurious fins six above and below, the anterior not high; tail divided, and at its origin doubly carinated. Vent prominent. Colour dark blue on the back, striped like the mackarel, but more obscurely and with fewer stripes; a row of large dark spots from the pectoral fin to the tail, sides and belly thickly covered with smaller dusky spots. The tail, gill covers and sides, and behind the eye, bright yellow. From the mackarel, which it resembles, this fish differs in the markings of the head, longer snout, larger eye and gape, longer head, and in

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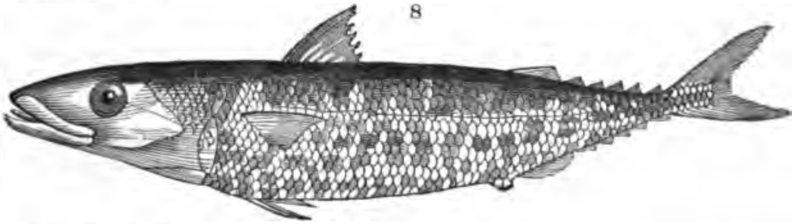


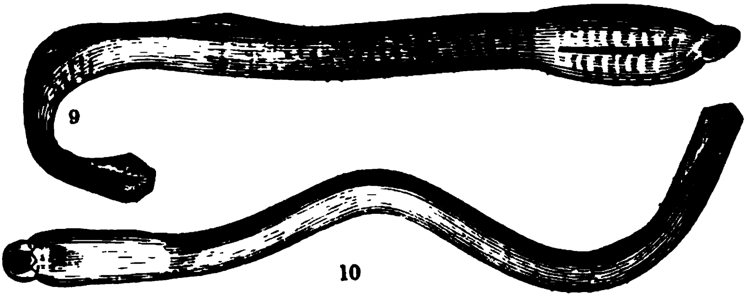
having scales on the anterior gill covers. The body is not nearly so much attenuated posteriorly; the ventral fins are sharp and slender, those of the mackarel wider and more blunt: in the former, the pectorals lie close to the body; in the latter, they stand off; in the latter, also, is a large angular plate, the point directed backward, close above the pectoral fins, which does not exist in the Spanish mackarel (*S.* macu-làtus *C.*).

It seems to be the Còlias Rondelèt*ii* of Ray. (*Syn. Pisc.*, p. 59.) I have given it the name by which it is known to our fishermen.

This fish is scarce, but some are taken every year. It does not often take a bait, although the fishermen inform me that this sometimes happens; and that its infrequency is owing to the difference of feeding rather than to want of rapacity. It is more frequently taken in drift nets; but even then it is only one at a time, and at considerable intervals. It is in no estimation as food.

MUD LAMPREY (PETROMỲZON *L.* CÆ̀CUS *Ray*); Class VI. *Chondropterygous Fishes.*

This species (*figs.* 9, 10.) grows to the length of 6 in., and is about the size of a goose-quill. The mouth, when open, is irregularly oval, throat capacious, teeth large and blunt, placed circularly from the roof of the mouth to the under jaw; upper lip prominent, fleshy, movable at the sides. Orifice on the head; apertures for breathing along the sides, seven in number. The body dilated at this part. No eye discoverable. Body cylindrical to the vent, which is far back, thence compressed, tapering. First dorsal fin on the hind part of the back, small and narrow; the second close to it, elevated, and then narrow, passing round the extremity of the body, and below reaching half-way from the tail to the vent. Colour a dusky yellow, dark on the back, light below; fins light.



This species, from the absence of eyes, is sufficiently distinguished from others of its genus. It is mentioned by Ray (*Syn. Pisc.*, p. 35.), but omitted in later systems of natural history.

If in its habits the silver lamprey (P. fluviátilis *L.*) bears a resemblance to the glutton (*U'rsus* gùlo *L.*), this makes as near an approach to the mole (*Tálpa* europæ'a *L.*). It frequents our smaller streams, living in the muddy bottom, from which it rarely, if ever, willingly emerges. I have kept it for months in stagnant water, with mud at the bottom, without injury to its health or activity. The only apparent use of its fins is to enable it to regain its station, when forced from it by violent torrents. When kept in clear water it seems to sleep much. I have never found this species to attach itself to any object by the mouth; but the lips are capable of extensive and complicated motions. It spawns at the end of April and the beginning of May. Fishermen collect them to use as bait when whiffing for pollacks.

Art. V. *An Essay on the Analogy between the Structure and Functions of Vegetables and Animals.* By William Gordon, Esq. Surgeon, Welton, near Hull. Read before the Hull Literary and Philosophical Society, Nov. 19. 1830. Communicated by Mr. Gordon.

(*Continued from* Vol. IV. p. 393.)

I have now pointed out the close analogy that exists between vegetables and animals, in so far as it regards the form of their ultimate corpuscles, the composition, and extensive diffusion of their membranous matter, the structure of their cellular tissue, and the organisation and functions of their cutaneous system. I shall next endeavour to show that plants, as well as animal beings, possess a muscular tissue. In order to do this, I must first take a review of the properties of muscular fibre, as they are exhibited in the animal body.

The properties of muscle may be divided into physical and vital. The former are, cohesion, flexibility, extensibility, and elasticity. On these it is not necessary for me to make any observations. The vital property of muscle is what more immediately concerns our subject, and is termed contractility: it is that specific faculty which muscular fibre possesses of contracting or shortening itself. When a stimulant is applied to a muscle, its fibres are thrown into what is called a state of contraction: its belly swells out, and grows hard to the touch; its surface, which in its natural condition was smooth, becomes wrinkled, and its two extremities approximate, so that the parts to which they are attached are drawn nearer together: thus, when the biceps flexor muscle is made to contract, the forearm and hand are raised towards the shoulder. Contractility, or, as it is called by some, irritability, is peculiar to muscular fibre, and does not belong to any other animal solid whatever. Blumenbach has, indeed, ascribed to membrane a kind of contractile power; but the example of it which he adduces can, with more propriety, be referred to elasticity. Muscular contraction never takes place, except on the application to the muscular fibre of some irritating agent, which is called a stimulus. These agents or stimuli are exceedingly numerous, and consist of mechanical impulses of every degree, of a variety of chemical substances, of electricity, and of volition. The older physiologists endeavoured to account for contractility on mechanical principles, and to refer it to the operation of elasticity; but, if we carefully note the phenomena that attend it, we shall perceive that it bears no analogy whatever to this or any other species of mechanical force.

In the first place, the contraction of a muscle is always greater than the cause by which it is produced: so that it appears that in contractility there is an actual generation of power; whereas, in the reaction of elastic bodies, the effect produced can never exceed the amount of the cause producing it. In the second place, in contractility, the reaction commences during the application of the mechanical agent; but in elasticity, the reaction cannot take place until the force that had been impressed is removed. For example, if a straight piece of whalebone be bent into a curve, it cannot regain its original form until one of its extremities be liberated; but, if the surface of a muscle be scratched with a sharp-pointed instrument, its fibres begin to contract the very moment the operation is commenced. In the third place, the contraction of muscular fibres, after continuing some time, is succeeded by a state of relaxation or exhaustion, even although the stimulus continues to be applied to them; and muscles which have become exhausted or relaxed, after having been in a state of contractility, cannot be again excited to act until a certain period has elapsed. In mechanics, there is nothing which bears the slightest resemblance to this; for in every description of machinery a certain effect will always be produced so long as the application of an efficient cause is continued. Such are the properties of muscular fibre, and such are the phenomena attendant upon and peculiar to contractility.

We shall now proceed to examine some of the actions of vegetable organs. If we can discover that these actions are accompanied with phenomena such as we know can only be referred to muscular contraction, shall we not be justified in concluding that vegetables, as well as animals, are furnished with muscular organs. Most persons are aware that when the lower part of the stamens of the flower of the berberry (*Bérberis* vulgàris) are touched, however slightly, they instantly bend themselves towards the pistil; in a short time they become relaxed, and resume their natural position. The contractile effect in this case, as far as I have observed, is always much greater than the amount of the cause by which it is produced; and, in experiments, I have witnessed that relaxation will take place at the same time that the mechanical cause which excited the contraction continues to be impressed. Moreover, the stamen of the berberry can be made to contract, even after it is cut from the flower, precisely in the same manner as the heart can be excited to action after it has been removed from the body. In the sensitive plant [or rather, humble plant, Mimòsa pudìca] we perceive very strong indications of contractility. It is well known that its leaves will collapse on the slightest touch, and fold themselves up. The Dionæ̀*a* Muscípula is another striking example of the existence of muscular contractility in plants. The leaves are each terminated by two lobes, which are furnished with long spines, and besmeared by a fluid substance which they secrete. As soon as a fly alights upon the lobes they immediately close, and, by squeezing the insect forcibly upon their points, they kill it almost instantaneously. The upper surface of the leaves of the Drósera rotundifòlia (common or round-leaved sundew) is covered with a number of small red hairs, on the extremity of each of which is placed a globule of viscid fluid. When an insect comes upon the leaf, the hairs, which are very contractile, bend round it on every side, and keep it fast. The viscid globules also serve to detain it; but their chief use seems to be to destroy its life, which, by their excessive acrimony, they speedily accomplish. The two lips of the stigma of the Gloxín*ia**, before fructification, are seen to open; but, as soon as a particle of pollen falls upon their inner surface, they instantly close. From these examples, and I could adduce many more, it will be perceived that several of the actions of plants are attended with phenomena which can be attributed only to contractility. They cannot be the result of elasticity, or of any mechanical arrangement, for they entirely resemble the phenomena which accompany muscular contraction, as it is exhibited in the animal body. In conclusion, I may remark, that the strongest indications of contractility are, perhaps, perceived in the petals, stamens, and other organs of the flower. Accordingly, we find that these are the most animalised parts of plants; for their chemical composition agrees with that of muscular fibre, the ultimate elements of which consist of carbon, hydrogen, oxygen, with a large proportion of azote.

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* In which, or in every, species of Gloxín*ia*? The stigma in the genus *M*ímulus is also formed of two broad lips, which in warm weather are distended, but promptly collapse on being touched; *M.* lùteus evinces this irritability very conspicuously, in which species it was discovered, and first pointed out to me, by a botanical assistant, Mr. George Woolsey. I have subsequently examined *M.* moschàtus, and other species of this genus which exhibit the same phenomenon, although in a lower degree than *M.* lùteus does. Mr. David Don informs me that the lips of the stigma in *M.* glutinòsus are eminently sensitive. — *J. D.*

That many of the movements of plants are purely mechanical there can be little doubt; we may take, for example, the movements of the Celòsia, and those of the Parietària, and of many others: but that those I have enumerated are the result of contractility, and of contractility alone, cannot, I think, for a moment be questioned. But perhaps it will be argued, that, if we assign to plants the property of contractility, we must likewise endue them with a nervous system; because, according to some physiologists, muscular contraction cannot take place without the intervention of nerves. They affirm, that, when a muscle is operated upon by a stimulant so as to be excited to contract, the impression is not, in the first instance, made upon the muscular fibre itself, but that it is first received by the nerves connected with the muscle, and then transmitted by them to the muscular fibre. It will be seen, however, from various facts which I shall state, that this opinion is not correct, and that the property of contractility is totally independent of the agency of the nerves. In the first place, it is well known that the heart is formed a considerable time before the brain; for, if the chick in an egg be attentively examined during the earliest periods of existence, the only mark of life that can be perceived is a small beating point, called the punctum saliens. This point gradually expands, and is converted into the muscular substance of the heart. It is not, however, until some time after the heart has been seen to pulsate that the brain and nervous system become visible: so that it is evident that the action of the heart is independent of the influence of the nerves. In the second place, we know that the quantity of nerves with which the heart is supplied bears no proportion to its degree of contractility. Thirdly, the heart, and many other muscular parts, long after they are removed from the body, will contract very forcibly on the application of a stimulant. Fourthly, mature fœtuses have been born, in whom there was no vestige either of a brain or a spinal cord; and it has been shown by experiment that the heart will continue its contractions, as usual, for some time after both the brain and spinal marrow have been totally destroyed. In the fifth and last place, if the nerves belonging to the right extremity of an animal be divided, as was done in the experiment of Dr. Philip, related in his *Experimental Inquiry*, while those of the left extremity are allowed to remain entire, and if the corresponding muscles of each extremity be made to contract by the direct application of a stimulant, it will be found that those belonging to the extremity in which the nerves are divided do not lose their contractility sooner than those attached to the extremity in which the nerves are left untouched, and scarcely so soon. Besides, it seems very clear that the involuntary muscles, as in the heart, &c., which are continually moving, have no nerves of motion whatever. They have only nerves of simple sensation; for these muscles are not stimulated to contract when electricity is applied to the nerves which are distributed to them; and we know that electric fluid is incapable of acting upon the simply sensitive nerves, while it operates powerfully on the nerves of motion. Such are the proofs that contractility is an inherent power of the muscles, and is independent of the nervous system.

This being the case, then, it is clear that, although plants may possess a muscular or contractile, they may, nevertheless, be entirely destitute of a nervous, structure; for it is very evident that the existence of the latter is not necessary to that of the former. Since, then, contractility can exist independent of the agency of the nerves, it follows that it may be exercised without consciousness; for there can be no consciousness apart from a nervous system. Plants, therefore, notwithstanding they are possessed of strong contractile power, may be, nevertheless, perfectly unconscious beings. To prove, indeed, that contractility may be performed without consciousness, we have only to take note of what is going on within own persons. The heart and blood-vessels are constantly circulating the blood, the bowels are propelling forward the chyle and fæces, and the diaphragm is every moment contracting and relaxing. All these functions depend upon contractility, and yet they are perfectly imperceptible to the mind. The instinct of plants (for plants possess instinct as well as animals) results from their contractile power. Plants will seek and turn towards the light; the roots of plants will go in search of proper nourishment, and, if they approach a situation which would be injurious to them, they instantly turn away from it. If a plant be laid on a table, near a sponge filled with water, it will direct its roots towards the sponge. If the sponge be removed to another place, the roots will likewise change their direction in pursuit of it. The hop plant, turning round a pole, follows the course of the sun from east to west: these are all examples of instinct.

I have now endeavoured to prove that a muscular tissue exists in vegetables as well as animals. My next object will be to show that plants likewise possess a nervous tissue. In doing this, I am not unconscious upon what very debatable ground I am entering. At the same time, I must confess that the facts which the researches of physiologists have discovered render it more than probable that plants are endued with nerves. The nervous system, as it is found in man and the higher classes of animals, consists of the brain, the spinal cord, the ganglia, and the nerves. The brain is enveloped in three distinct membranes, and is encased in the bones of the cranium. The spinal cord, which is merely a prolongation of the brain, is also enclosed in a strong membranous covering, and is lodged within the cavity of the backbone. The nerves are small white medullary cords, which take their origin from the lower surface of the brain and from the lateral parts of the spinal cord. They pass out through apertures at the bottom of the skull and sides of the vertebræ, and are ramified over every part of the body. The ganglia are found in various parts of the nervous system. They resemble little brains, and are supposed to be sources of nervous energy. In many of the lower animals, as worms and insects, no brain is to be found, but only one or two longitudinal nerves placed in the centre of their bodies, having attached to them, at various distances, minute ganglia from which fresh ramifications of nerves proceed. The faculty which the nervous system exercises, is to receive and transmit the impressions of external objects to the brain; where they may be rendered sensible to the mind, giving rise to what are denominated perceptions. This faculty is called sensibility, and it possesses two distinct modes of operation. The one is produced by external impressions, which are conveyed by the media [means] of the nerves to the brain; the other is derived from some change being generated in the brain itself, which is transmitted along the nerves to some of the corporeal organs. This latter constitutes volition. Notwithstanding, however, that nervous action is often succeeded by perception, yet there are many cases in which impressions never become perceptible to the mind: in other words, sensation is generally attended with consciousness; but it may exist without it. For example, whenever the nerves of any of the external senses are acted upon by their appropriate stimuli, as, for instance, when light is applied to the eye, we are conscious of the impression; but when food is taken into the stomach, we feel no impression or sensation at all; and yet we know that the stomach sensible to the stimulus of food, as the eye is to that of light. Are we, then, from these circumstances, to conclude that there are two different classes of nerves, one of which exercises the functions of perception and volition, while the other possesses only the power of transmitting nervous influence, and is incapable of exciting perception. Mr. C. Bell, Majendie, and other physiologists have proved by innumerable facts and direct experiments, that there are two classes of nerves, perfectly distinct from each other. The first class is called the symmetrical, and consists of the fifth cerebral, and all the spinal nerves: they arise by double roots, and are ramified upon the voluntary muscles: they constitute the organs of perception and volition, and form the means whereby the animal body is connected with the external world. The second class of nerves is termed the irregular, and it includes what are called the respiratory and the ganglionic nerves. They arise, by single roots, from the base of the medulla oblongata [the medullary substance lying within the cranium or skull, which is the beginning of the spinal marrow], and are distributed to the conservative organs of the body, such as the stomach, the lungs, the heart, &c., which they connect intimately together. They unite with the symmetrical nerves, and form the bond of union between the two halves of the body. Their property is to transmit the nervous influence from one part to another; but they do not possess the faculty of communicating either perception or volition. From this account it appears that there are no less than five distinct sets of nerves. For instance, the symmetrical or regular class consists of nerves of sensation and of nerves of motion. If a nerve of sensation be pricked or irritated, great pain is produced; and, if the same nerve be divided, all sensation is destroyed, but the function of motion is not in the least impaired or affected: on the contrary, if a nerve of motion be lacerated or injured, the muscles upon which its filaments are ramified become convulsed; but, if a motific [motion-causing] nerve be fairly cut in two, the motion of the parts to which it is distributed is entirely lost, but their sensation, or power of feeling, remains perfect and natural. The irregular class consists of the nerves distributed to the muscles concerned in the function of respiration; and of the ganglionic nerves, which, as I have observed above, are conducive to growth and nutrition. Besides these four sets, there are the nerves of the external senses, such as the nerves of touch, the olfactory, the optic, the auditory, and the gustatory nerves.

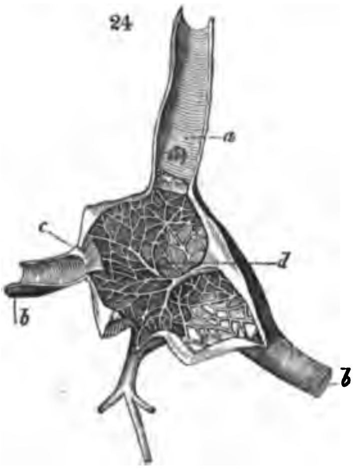
(*To be continued.*)

Art. VI. *An Introduction to the Natural History of Molluscous Animals.* In a Series of Letters. By G. J.

Letter 9. *On their Circulating System.*

Sir,

Aristotle divides animals into those which have blood, and those which have none; and these primary classes were appropriately named the sanguineous and exsanguineous. Among the latter he places the Mollúsca, as all naturalists did for a long time afterwards, and as all, except naturalists, continue to do. Blood is scarcely known to the vulgar unless by its red colour; and so essential is this character deemed, that it appears to them little less than an abuse of language to apply the term to any white or colourless fluid. Even Linnæus seems to have participated of this prejudice, and to have yielded to its influence, when he called the circulating fluid of the Mollúsca a *sanies:* but to call it any thing else than blood is apt to lead into error; for it possesses all the essential properties of blood, flows in an analogous circle of vessels, and answers the same purposes in the system.



The circulating system of the Mollúsca consists of a heart, either single, or with its parts disjoined; and of two kinds of vessels, viz. arteries and veins: and the latter are supposed to perform the additional function of absorbents; for nothing analogous to these has been yet detected. The heart is very various in point of figure, but is always evidently muscular, and has its interior strengthened with fleshy cords (columnæ carneæ), interlaced in every direction. (*fig.* 24. *) It is placed in general in the back, above the alimentary canal, near to or between the branchiæ, and in a cavity usually called the pericardium, and considered, according to Blainville erroneously (*Manuel de Malacologie*, &c., p. 131.), as the representative of the same sac in the vertebrate animals. The arteries are very elastic, and probably muscular, although no fibres can be detected in their gelatinous structure; their coats are thicker and stronger than those of the veins, which, indeed, are so extremely thin as frequently scarce to be distinguished from the tissues in which they run. The veins do not appear to be provided with valves, as you know the veins of other animals are; but valves are placed at the orifices between the cavities of the heart, and very often at the entrances into the primary arterial and venous trunks.

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* Interior view of the heart of Octòpus vulgàris, from Cuvier. *a*, The aorta; *b*, branchial veins; *c*, the valves; *d*, columnæ carneæ.

With regard to the distribution of the sanguiferous vessels, it will be necessary to give a sketch of it in the principal orders separately; for it is subject to such important and considerable modifications, that there would be great difficulty in giving an intelligible view which would be applicable to molluscous animals as a whole. We may, however, observe, that, in all, the blood issuing from the heart is distributed through the body by the medium of the arteries, and returned towards the centre by the veins, which have united there into one or a few trunks; whence, again, they diverge into numerous ramifications, to conduct the blood through the branchiæ or gills, to be brought back by a corresponding set of vessels to its point of departure. The circulation, therefore, is essentially the same as in the vertebrate animals; but there exists in the latter an arrangement of vessels of a very peculiar kind, for a circulation through the liver — the system, as it has been called, of the *vena portæ*, — to which there is nothing comparable in the Mollúsca.

In the Cephalópoda there are three hearts. The true systematic heart, marked *a* in the diagram annexed (*fig.* 25.), consists of a single cavity, and is situated towards the centre of the body, between the gills. By its action the blood is propelled directly into a large artery or aorta (*b*), and into two smaller vessels, to be distributed, by their joint ramifications, to every organ and point of the body. One of the small arteries comes off from the inferior surface, and is destined to supply the testicle or ovary; the other rises from the anterior surface, and supplies in part the gills, the sac, and more especially the intestines and chylopoietic viscera; but it is the aorta, issuing from the heart on the posterior side, which carries the great mass of blood through the system, to furnish new materials for its growth and secretions. From the extreme branchlets of the arteries the blood flows on into the capillary extremities of the veins, and commences its return to the centre; for the small branches of the latter vessels converge and unite, by frequent anastomoses (inosculations), into larger ones, until they are collected into a few trunks. The veins of the feet and superior parts form ultimately two of these (*c*), which almost immediately coalesce

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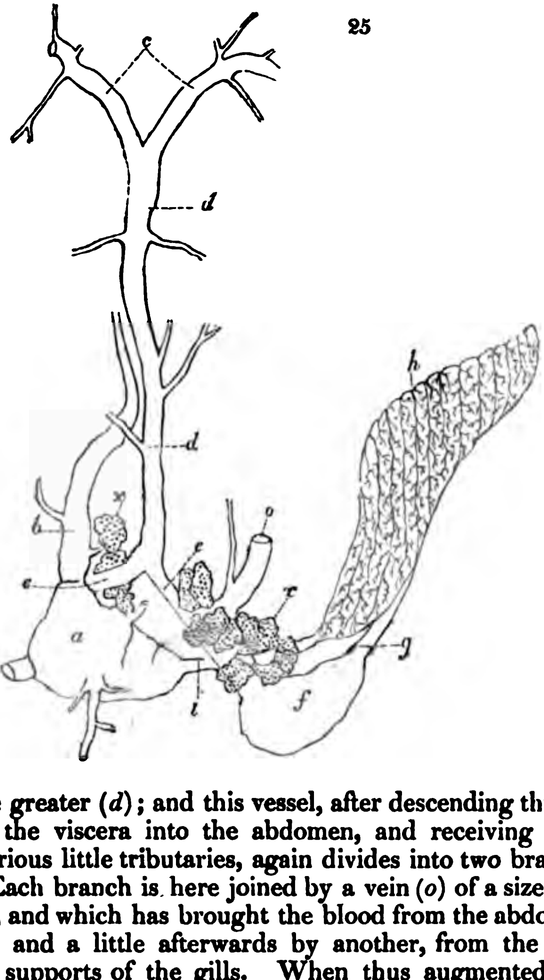

into one greater (*d*); and this vessel, after descending through part of the viscera into the abdomen, and receiving blood from various little tributaries, again divides into two branches (*e e*). Each branch is here joined by a vein (*o*) of a size equal to itself, and which has brought the blood from the abdominal viscera; and a little afterwards by another, from the cloak and the supports of the gills. When thus augmented, they proceed to their termination in the lateral hearts, placed, one on each side, at the root of the branchiæ. These hearts (*f*) are called pulmonic; they are rather cellular than fleshy in texture, moderately thick, of a blackish grey colour in some genera, pale red in others, and pitted internally with many little cavities communicating together. Two lar
are placed at the venous orifice, to prevent regurgit
there is none at the orifice by which the blood

artery (*g*), whose function is to carry it forwards to the gills or branchiæ (*h*), where, circulating through the windings of their beautiful leaflets, it is purified, and thence returned by veins running in the reverse direction, and which open at last by a single trunk (*i*) into the systemic heart, again to run the same endless circuit.

I have omitted in this description a very remarkable peculiarity connected with the venous system, and which merits our particular notice. Previously to their junction with the pulmonic hearts, the two branches into which the great dorsal vein bifurcates, and their accessory veins, pass across two large cavities, called *venous* by Cuvier, which communicate externally by an aperture on each side near the gills. In this part of their course the veins are garnished with some very singular glandular bodies (*x x*, *figs.* 25. and 26.), of a spongy cellular structure and yellow colour, from which an opaque yellowish mucous secretion can be easily pressed in considerable quantity. The cells of these bodies open freely into one another, and they have likewise a very free and direct communication with the interior of the veins to which they are appended (*fig.* 26.); but of their use it is difficult to form an opinion. Cuvier makes several suppositions: they may be, he says, diverticula [side-paths], in which the venous blood is more fully exposed to the purifying influence of the circumfluent water; or they may be excretory canals, by which the spongy glands pour into the vein some substance which it could not of itself extract from that fluid; or, on the contrary, they may be emunctories, by means of which the blood is purged of some noxious principle. This last conjecture, he thinks, is rendered more probable by the abundance of the yellowish mucus poured out; and it is certain that the communication between the interior of these bodies and the medium in which the animals live is very open; for when air or an injection is thrown into the vein, the air or the injection passes very readily through the glands into the venous cavity, and thence outwards; or, on the contrary, if air is blown by its external orifice into this cavity, it

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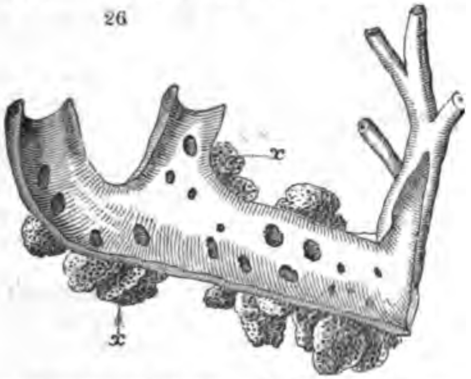

passes thence very often into the veins. "Were it practicable," says Dr. Fleming, "to analyse the yellow mucus which these glands contain, some light might be thrown on the subject: indeed, it appears not improbable that this arrangement is analogous in its functions to the urinary system in the most perfect classes." (*Philosophy of Zoology*, vol. ii. p. 426.)

The circulatory apparatus of the Gasterópoda is less complex than that of the preceding order. They have a single heart, the position of which in the body is regulated by the position and symmetry of the branchiæ; for, in molluscous as in vertebrate animals, the heart is never far distant from the aërating organs. In the greater number of the Gasterópoda it is situated in the back, above the intestinal canal, at an equal distance from each gill when this is paired, or obliquely to the left, and rarely to the right, when it is single. It is composed of an auricle and a ventricle: the former cavity is very variable in shape, and has very thin but muscular walls; the latter is equally variable, but, in general, of greater capacity, and more decidedly muscular. It is from one of the extremities of its great diameter that the arterial or centrifugal system proceeds; sometimes by a single trunk, or more commonly by two vessels. Of these, one is anterior, and the other posterior: the first furnishes branches to the head, to the gullet and adjacent organs; while the second sends its ramifications to the stomach, intestines, the liver, and the secretory organs of generation. The blood is brought back from these distant parts, as in other animals, by the venous, or, as it has been happily designated, the centripetal system; the numerous branchlets of which, after repeated inosculations, are at length united into one large trunk, which, generally without the intervention of any dilatation or auricle, assumes the character and office of a pulmonary artery, that again divides and subdivides itself, to conduct the circulating flood through all the sinuosities of the gills.

The description just given is liable to many exceptions, were we to descend to particular families and genera; and, although in a sketch of the kind I attempt to give you, it is impossible to notice all their peculiarities, yet it may be useful, and not void of interest, to select a few examples illustrative of the most remarkable anomalies in the arrangement of their circulating system. The Tèthys *l*eporìna (*fig.* 27.*), a native of the shores of the Balearic Isles, will afford our first instance.

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* From Cuvier's *Mémoires pour servir à l'Histoire et à l'Anatomie des Mollusques*; the most valuable work by far in this department of natural history.

In this singular and beautiful creature, the heart is situated in the middle of the back, immediately under the skin. Its oval and very thin auricle receives the branchial veins, which trend towards it like the spokes of a wheel towards the nave, and pour into it the purified blood, not by one or two, but by numerous orifices. The opening from the auricle to the ventricle is furnished with two very distinct valves; and, as usual, the latter cavity is more fleshy and opaque than the auricle, of an oval form, and strengthened with small muscular cords. Two principal arteries take their departure from it; one of which, proceeding forwards, gives branches to the stomach, œsophagus, to the organs of generation, to both sides of the back and foot, and lastly loses itself in the veil; while the other artery, directing its course backwards, is principally distributed on the rectum and liver. The veins issuing from this organ, and from the intestines, run in the sides of the body, where, in conjunction with the veins returning from the

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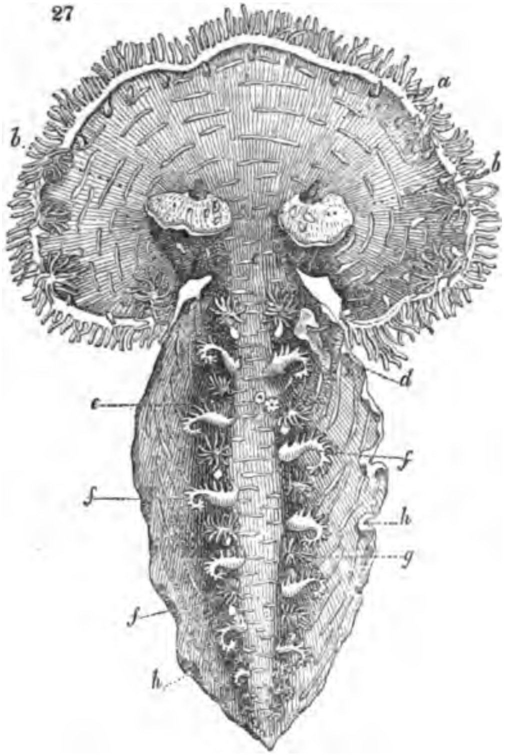

a, Veil; *b*, tentacula; *c*, neck; *d*, organs of generation; *e*, anus and another excretory orifice; *f*, greater branchiæ; *g*, lesser branchiæ; *h*, margins of foot.

foot, the back, and the veil, they form ultimately two main vessels to carry the blood to the branchiæ; which are external, and arranged like crests, in two rows along the back, the principal ornaments of the animal.

We may take our next example from among the terrestrial Mollúsca. The heart of the slug (*Lìmax* àter) is placed almost on the middle of the pulmonary cavity, "included in an extremely thin bag or pericardium, in whose cavity there is abundance of watery moisture, as clear as the purest crystal." The auricle is of a triangular figure; the apex resting on the superior surface of the oval ventricle, and the much dilated base receiving the pulmonary veins, which, like those of the Tèthys, open into it by many mouths. But the peculiarity most worthy of notice in this animal is the colour of its arteries; an opaque and pure white, like what it would be were we to suppose them filled with milk, and rendered very obvious by the darkness of the grounds upon which the vessels trace their course; as, for example, in the intestines, which are of a dark green; or in the liver, which is of a blackish brown colour. The finest injections do not produce any thing, adds Cuvier, more agreeable to the eye of the anatomist than the white ramifications of the arteries in the black slug.

The most singular deviations from the normal structure and disposition of the blood-vessels in the Gasterópoda are, however, to be found in the celebrated Aplýsia. In this mollusque, the great branchial vein receives the aërated blood from its little tributaries, which penetrate it in such a manner that their orifices form imperfect circles on the inner surface. The vein itself runs along the convex border of a crescent-shaped membrane, supporting the branchiæ, and opens, as usual, into the auricle; remarkable for size and the thinness of its parietes [walls], which resemble fine gauze, the very slender fleshy filaments forming a pretty network. The ventricle is oval, and its walls are also thin, although furnished with fleshy columns, crossed in every direction. The aperture between it and the auricle is provided with two valves, which hinder any reflux of blood. The aorta proceeding from the ventricle divides into two trunks; the first, trending directly to the left, pierces the pericardium, after a very short course, to enter the abdomen; the second returns at first towards the right, sends off a branch, and then leaves the pericardium also at its right side. The portion enclosed in this cavity has attached to it two crests composed of small vessels, which rise from the trunk itself, and again reenter it, without affording the anatomist any clue whereby to guess the use of such a curious formation. It is always easy to inflate or inject these crests; and Cuvier hazards a conjecture that they may be secretory organs for the production of the liquid which fills the pericardium.

But a still more extraordinary peculiarity remains for our notice. The large vessel which carries forward the venous blood to the branchiæ, and which may be named either a vena cava, or a branchial artery, since it fulfils the functions of both, after sending off arterial branches to the leaflets of the gills, remains for a certain space smooth and entire; but one part curves itself to the left, and another to the right, and these two branches assume suddenly a new form and structure; they become, in fact, absolutely confounded with the great general cavity of the body. Their walls are now formed of transverse and oblique muscular ribands, which cross in every direction, but leave between them apertures visible to the naked eye, and permeable to all sorts of injection; thus establishing a free communication between these vessels and the abdominal cavity, so that the fluids contained in the one can readily permeate into the other. This structure is so anomalous, that Cuvier was for some time doubtful of the accuracy of the dissections which seemed to prove it; but at last he fully satisfied himself, and ascertained distinctly that there was no other vessel to carry the blood to the branchiæ except the muscular and perforated cavities just described, and into which all the veins of the body open directly or indirectly. It follows, therefore, that the fluids shed into the abdomen can mix directly with the mass of blood, and be carried to the branchiæ with it; and that the veins perform the office of absorbent vessels. This vast communication, says the great naturalist from whom I borrow these anatomical details, is, doubtless, the first step to that still greater which nature has established in insects, where there is no particular vessels for the nutritive fluid; and we have already seen a trace of it in the Cephalópoda, where the venæ cavæ and the abdominal cavity communicate together through the medium of certain spongy glands.

In the genus Orchídium, a naked mollusque, the venæ cavæ exhibit a formation in some respects similar to that in Aplýsia; but I pass over this, to notice another sort of deviation from the common, in the ear shell (Haliòtis), and in some simple univalves; as, for example, in Fissurélla. The heart in those genera is provided with two auricles; one of which receives the vein carrying the purified blood from the right branchiæ, and the other that from the left. The auricles open into the ventricle each by a single and generally narrow orifice; but in the Chitónidæ each auricle has two distinct and separated ventricular orifices; of which, according to Cuvier, there is no similar example to be found in the animal kingdom. Further, in these genera, the ventricle, or proper heart, is perforated by the straight gut, or, in other words, the heart encircles that intestine; a peculiarity not to be observed in other Gasterópoda.

What, however, is the exception and anomaly among Gasterópoda, becomes the usual formation in the Conchífera or bivalved Mollúsca; for in by much the greater number of them the gut passes through the heart, or rather, as Blainville explains it, the heart is curved round the rectum, in such a manner that the two extremities of its transverse diameter seem to touch. All the bivalved Mollúsca have also two auricles; one placed on each side of the ventricle, and opening by a narrow neck into it. They receive the blood through a branchial vein coming from each gill, and transmit it to the ventricle, which is an oval or spindle-shaped bag, situated in the medio-dorsal line.* From the ventricle two aortæ depart: a posterior and lesser one, which passes under the rectum, and distributes its branches to the posterior parts of the body; and an anterior one, which runs forward even to the anterior adductor muscle, furnishes branches to the stomach, to the liver, the foot, and adjoining parts, then curves downwards by an anastomosing branch, which follows the margin of the cloak, to meet and unite with a similar branch from the posterior aorta; forming thus a great arch, of which the inferior branches go to the tentacular fringe of the cloak, while the others, of greater size, remount and ramify over the whole surface of that organ.

Of the centripetal system we find that the venous radicles of the belly and of the anterior parts of the body unite into two large trunks, which issue from the hepatic region underneath the rectum, and, after having received two veins which have followed the margin of each lobe of the cloak, they open into the anterior end of a sort of auricle or venous reservoir, placed longitudinally below the heart in the dorsal line. This reservoir receives at its posterior end two other rather large veins, which have gathered the blood and brought it back from the posterior parts of the body, and even from the margins of the cloak. From this reservoir the branchial arteries likewise originate: they are two in number, one on each side, of considerable size, and direct their course along the superior margins of the branchial laminæ, to which they furnish numerous branches. These form two series; one for the internal face of the external leaf, and the other one for the external face of the internal leaf of the branchiæ; but in consequence of the many vertical and anastomotic branchlets, a close vascular network is the result of the whole arrangement. The veins, drawing their supply from this network, run backwards in a direction parallel to the arteries, and form a similar network, but on the opposite faces of the branchiæ.

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* In the oyster, "the auricle and ventricle are very thin in their coats; so much so as to make them unequal to apply force to the blood; but the ventricle is laterally connected to the great muscle, whose action will accelerate the circulation." (*Home's Comp. Anatomy*, vol. iii. p. 160.)

As it offers some exceptions to this account of the distribution of the blood-vessels in the Conchífera in general, I am tempted to extract for you the interesting description of the circulation in *Terèdo navàlis*, as given by Sir Everard Home: — "The heart," he says, "is situated upon the back of the animal, near the head; consisting of two auricles (*fig.* 28.*), of a

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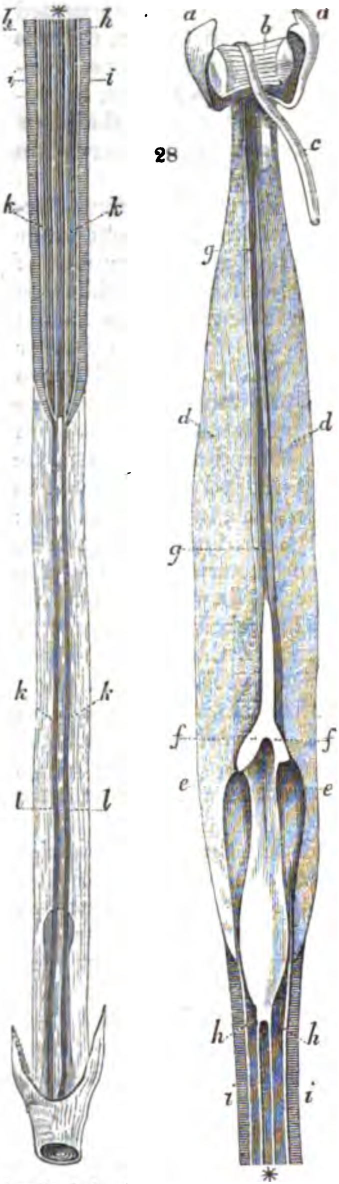

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* Figure of *Terèdo navàlis*, showing the heart and other internal organs, of the natural size, exposed in a posterior view. *a a*, The boring-shells, separated and turned back; *b*, the digastric muscle; *c*, the intestine passing over it; *d d*, the testicles; *e e*, the auricles of the heart; *f f*, the ventricle; *g g*, the artery going to the head; *h h*, the vessels from the branchiæ going to the heart; *i i*, the branchiæ or gills; *k k*, ducts of the testicles, traced through their course; *l l*, a strong substance, with transverse fibres, having a pile upon it, to strengthen this, the weakest part of the animal.

thin, dark-coloured membrane; the auricles open by contracted valvular orifices into two white strong tubes; these, united, form the ventricle, which terminates in an artery that goes to the boring-shell. The heart is loosely attached; its action is distinctly seen through the external covering, and in some instances continued to act after it was laid bare.

"The first contraction is in the two auricles, which are shortened in that action. This enlarges the ventricle before it contracts. The great artery from the ventricle goes directly to the head, and the vessels that supply the auricles are seen to come from the gills. The auricles are lined with a black pigment, so that their contents cannot be seen through their coats, and the ventricle, from its thickness, is not transparent; but the muscles of the boring-shells are of a bright red, and all the parts between the heart and head are supplied with red blood."

In the *Terèdo*, then, every part of the blood "passes through the vessels of the gills, and then through the cavities of the heart. As this animal is to work a machine capable of boring a very hard substance, and to go on working during the whole of that period of life in which its growth is continued, to make room for the increased bulk, so it requires that the blood be more highly aërated, and supplied with greater velocity to these active organs. The heart, also, to give it greater advantage in these respects, is placed near to the boring-shells, so that the blood which goes to them is of the brightest colour.

"In this circulation, the first action of the heart is to supply the different parts of the body with aërated blood: upon this the activity of the heart is wholly exerted; the blood is returned more slowly through the gills, and remains there a longer time, so as to receive a greater degree of the influence from the air contained in the water." (*Lectures on Comp. Anatomy*, vol. iii. p. 162, 163.)

In the Mollúsca tunicàta, the circulating apparatus is simpler than in any of the other orders. The heart of the Ascídia is an organ with a single cavity, situated near the stomach, and presents a less distinct muscular structure than it does in cephalous Mollúsca. It is of an oblong or spindle shape, and the two extremities are prolonged into two vessels, almost equal to itself in their diameter. One of these vessels receives, as it is believed, all the blood from the branchiæ, and is in consequence named the branchial vein; the other, of greater length, is an aorta to distribute the blood through the whole system. (*Savigny, Mém. sur les Animaux sans Vertèbres*, vol. ii. p. 113.)

Such is a very general outline of the circulation in this tribe; nor are the particular modifications to which it is subject, of sufficient interest to detain us. I may just remark, that the minute vessels of the branchiæ form a beautiful network, similar to that on the branchial leaves of bivalves.

The heart has been seen pulsating in several Mollúsca whose bodies possess a considerable degree of transparency. The pulsations are slow, and often at unequal intervals; but this irregularity may be the effect of weakness or of pain; for the animals must be placed in unnatural positions, or removed from their proper element, before the observations can be made; and an attention to this circumstance may explain the fact of a retrograde motion of the circulating fluid, which has been observed by some naturalists. The blood itself is of a bluish white colour, and glutinous consistence. Lister tells us, that when he kept the blood of a snail in a vessel for some days, it remained liquid and entire, not separating, in the manner of human blood, into two portions of unequal densities; but, when he applied heat, it readily congealed into an opaque bluish coagulum, just as the human serum would have done under the same circumstances. But Lister knew well that the blood of these creatures was not homogeneous; for he adds, that with a good microscope it is easily shown to consist of globules swimming in a limpid fluid; that these globules are truly round, and considerably exceed in size those of human blood; they are also heavier than the fluid part, since they gradually sink to the bottom when kept still in a glass tube. (*Exercitatio Anat. de Cochleis*, p. 95. Lond. 1694.) The late experiments of Prevost and Dumas have confirmed those of the old English naturalist: they have ascertained that the globules of the snail have a diameter one third greater than those of man* and quadrupeds; and, what is more remarkable, they found the globules to be really spherical, as Lister has asserted, although analogy would have led us to a different conclusion; for they are elliptical in birds, reptiles, and fishes, to which the Mollúsca are certainly much more nearly allied than they are to the Mammàlia. (*Zoological Journal*, vol. i. p. 178.) The globules in the bivalved Mollúsca are also, according to Poli, an eminent naturalist of Naples, much larger than in man; so that he considers the latter to be to the former as hemp-seed to millet-seed. (*Rudolphi's Physiology*, by How, vol. i. p. 132.) The red colour of blood has been attributed to the existence of iron in it in combination with phosphoric acid; but it militates against this hypothesis when we find that the white blood of the Mollúsca, although the contrary has been asserted, contains the same mineral ingredient: for Erman has detected iron, and very probably also manganese, in the blood of the Hèlix pomàtia and Planórbis córneus; and Poli likewise speaks of iron in the blood of A'rca glycýmeris. (*Rudolphi's Physiology*, by How, vol. i. p. 113.) As the following analysis may probably be applied with safety to the whole class, I extract the passage entire, notwithstanding it repeats some particulars already noticed: — "The blood of the Hèlix pomàtia," says M. Gaspard, "is rather thick, but without viscosity; it has a faint smell, a slightly saline taste, and is so abundant that each individual contains not less than a drachm and a half. It is of a delicate blue colour, which is neither altered nor modified by change of aliment, by asphyxia, or by hybernation. It is miscible with water, but of greater specific gravity, and falls to the bottom in visible streaks or entire drops. When exposed to the atmosphere, it does not spontaneously congeal, like that of vertebrated animals, but it separates by rest into two distinct fluids: the one blue, which swims at the top; the other colourless and opaque, remaining at the bottom of the vessel. In a few days it decomposes with fetor [stench]. It is unaltered by muriate of barytes, and by alcohol; is simply discoloured by potash, and by vinegar and other weak acids: but acetate of lead, nitrate of silver, and, still more, nitrate of mercury, occasion a copious dense precipitate. Boiling water, sulphuric and nitric acid, coagulate it strongly, like albumen." (*Zoological Journal*, vol. i. p. 177.)

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* The red globules of human blood, according to the observations of Mr. Bauer, as corrected by Kater and others, are one five-thousandth part of an inch in diameter. (*Home's Comp. Anat.*, vol. iii. p. 4., compared with p. 12.) But in the fœtus, the globules, say Prevost and Dumas, differ in their form and volume from those of the adult; the former being double the size of the latter (*Bostock's Physiology*, vol. ii. p. 200.), and approximating nearer, of course, to the size of those of Mollúsca. The fact is curious, when considered in relation to some speculations of Carus.

I am, Sir, yours, &c.

Nov. 12. 1831. G. J.

Art. VII. *Illustrations in British Zoology.* By George Johnston, M.D., Fellow of the Royal College of Surgeons of Edinburgh.

1. Lucerna'ria auri'cula.

Sir,

I do not think that the discovery of any new object or fact in natural history ever gave me greater pleasure than the first sight of the little creature here delineated. Its form is so singular, and so far removed from any with which non-naturalists are familiar, that some of my friends, on seeing the drawing, have actually asked to which kingdom, animal or vegetable, the thing belonged; and to uncommonness of shape, in adds beauty in colour and in ornament, and much vivacity in its motions. There is, to my eye, not a more lovely object among the numerous interesting worms that dwell on our shores. I had, on a summer's evening, taken a favourite station by the side of a pellucid pool hewn by nature in the rock, and was admiring the mimic landscape reflected from the water, when my attention was caught by what seemed to be a clot of blood adhering to the frond of a sea-weed; it might be, was the passing thought, a small bit of the liver of some mutilated fish, when, lo! it moved, and suddenly expanded before me in all its beauty. It was impossible to restrain open expression of admiration and pleasing surprise. It had risen up like an enchanted thing, and in a shape so novel, that fancy had not imagined its existence among animated beings; it displayed its ornaments, the beads and tassels of its border, with such grace, and its rich colour contrasted so well with the sombre darkness of the weed on which it had settled, that the most apathetic would have been warmed; while I leaped for very joy, and said within myself, Surely the Creator of all holds *this* out to lure his rational creatures to study his works, and search out his wisdom!

Our figure (*fig.* 29.) is of the natural size, and the individual from which it was taken was of a clear pinkish red colour. It adheres by a short stalk, which dilates into eight equal oblong arms, each terminated by a globose tuft of filaments, tipped with a gland. The arms are mottled with two rows of spots, produced by the opacity and configuration of the internal viscera; and they are connected together by a transparent membrane. Between each of them there is an oval vesicle placed on the edge of this membrane. Within the stalk there is a

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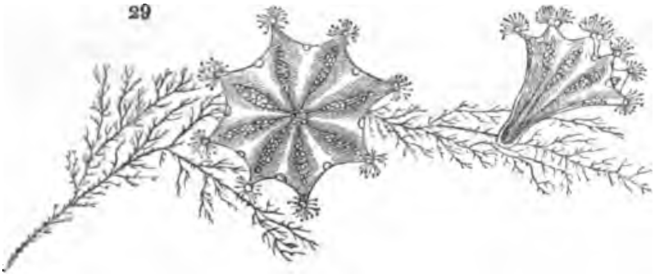

tube, which, prolonged, seems to form the mouth, of a square shape, projecting in the centre of the arms.

Lucernària auricula can move about at will, but has apparently not much power for distant excursions, and little inclination to roam. Fixed by means of its stalk, which is presumed to act as a sucker, on the leaf of a sea-weed in some sheltered pool near the lowest tide-mark, it escapes its enemies, I know not how; for it is the most helpless of creatures, without weapons of offence or defence. It catches little animalcules brought within its reach by the tide or their own destiny; and, for this purpose, the tentacula are widely displayed, and no sooner have they felt the prey, than they instantly contract, envelope it in their joint embrace, and carry it to the mouth. Lamarck says, that the globules at the tips of the filaments or tentacula are suckers; and if the observation is correct, it is obvious that this structure must enable them to retain living prey with great additional obstinacy.

This Lucernària is, I believe, a rare animal on our coasts, of which it was first ascertained to be a native by Mr. Montagu, who took it on the coast of Devonshire, and gave a figure and description of it in the ninth volume of the *Linnean Transactions*. In the edition of Pennant's *British Zoology* published in 1812, there is an account of it borrowed from Montagu's paper, but erroneous in many respects. Dr. Fleming's description, in his history of *British Animals*, is, however, evidently original. He says, the species is found on different parts of the coast. The colour, according to him, is "brownish:" according to Montagu, it is variable; and this may, with proper limitation, be correct, for our specimen was of a fine transparent red. It was taken in Berwick Bay.

Lucernària belongs to the class Radiàta, order *A*calèpha Cuvier, Móllia of Lamarck.

GEORGE JOHNSTON.

Berwick-upon-Tweed, Nov. 10. 1831.

ART. VIII. *On the Parasitical Connection of Lathræ̀a Squamària, and the peculiar Structure of its subterranean Leaves.* Read at the Linnean Society in November, 1829.

OUR readers will remember that in Vol. II. p. 105. Mr. Bowman, in noticing certain differences in habit and external organs which he had found to obtain in specimens of this interesting plant procured from, or observed in, various localities, incidentally announced his having discovered its true organisation and mode of growth. This discovery is the subject of a luminous paper, illustrated by eighteen figures from Mr. Bowman's pencil, in the sixteenth volume of the Linnean Society's *Transactions.*

In his highly interesting paper, the author details, with much clearness and precision, the result of his investigations on the organisation of this singular plant; and as they exhibit some striking exceptions from the general laws of vegetable physiology, not hitherto known, we shall present them to our readers as fully as our limited space will allow, and illustrate them by several of the original drawings confided to us by the liberality of the council of the Linnean Society.

It has long been known, that every part of the Lathræ̀a Squamària, except the flower-stems, is at all times strictly subterraneous; but we are not aware that any botanist has hitherto detected the nature of its parasitical connection, or the anomalous structure of its leaves. It may indeed be said to set the ordinary laws of vegetable life at defiance, even in its infancy; for no sooner has the embryo plant emerged from its cotyledons, than, instead of seeking the surface of the soil, it takes a downward direction, till it comes in contact with the roots by which it is nourished, after which it spreads horizontally among them. Its real root, it appears, is spindle-shaped and branched, terminating in forked fibres; which however do not draw moisture from the soil in the ordinary way, but are furnished at and near their extremities with very minute tubers, which fix themselves on the roots of trees and extract their juices. Similar tuberiferous fibres are copiously produced on the subterraneous stem between the imbricated scales. The tubers, though not larger than a small pin head, are exceedingly numerous, hemispherical, and of a succulent and tender texture. When fixed on the root, they throw down a funnel-shaped process or tap, which penetrates through the cortical layers into the alburnum (where the sap is in the greatest energy), and communicates with a system of vessels of a jointed or beaded structure. These vessels traverse the substance of the tuber, and convey their stolen contents along the connecting fibre for the support of the parasite. The annexed figure (*fig.* 30.) is a perpendicular section of a tuber, highly magnified, showing the insertion of its tap-shaped base into the alburnum.

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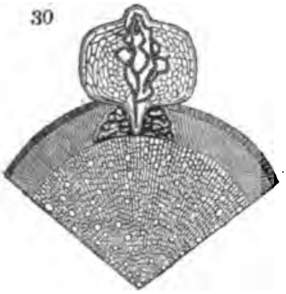

Not less wonderfully constructed and admirably adapted for their situation and office are the imbricated scales, or leaves, of the subterraneous stem, which, in size, shape, and colour, very remarkably resemble the human teeth, and have suggested its various names of Dentària, Squamària, and toothwort. These have generally been considered as roots, or scaly appendages to the roots; but Mr. Bowman has proved by numerous minute and delicate dissections under the microscope, illustrated by a series of beautiful and highly magnified drawings, and by a description and reasoning which we regret our space will not allow us to follow through all their details, that they are real leaves, adapted by their peculiar organisation for their subterranean situation, where, with the ordinary vessels of these organs, they could not have performed their functions. We shall endeavour, with the assistance of the drawings, to make this intelligible, after giving the author's preliminary glance at the usual process of vegetable life. "By laws which almost universally prevail in the vegetable kingdom, plants imbibe moisture from the soil by means of their radical fibres, and gases and moisture from the atmosphere through the medium of pores in the cuticle of their leaves. These elements are conveyed into the parenchyma, where innumerable and inconceivably delicate organs, stimulated by light and heat, throw off the oxygen, and retain the hydrogen and carbon. These essential ingredients at once produce the green colour, and are converted, by a mysterious and hidden process, into the several substances of the vegetable body." The succulent interior substance of the leaf of the Lathræ̀a is pervaded longitudinally by a number of parallel cavities or chambers, of nearly its whole length, and whose sides are full of ridges and hollows like the human ear. The entire inner surface of these cells is thickly beset with innumerable papillæ or glands, each fixed on a pedicel, and so minute as not to be discernible without a good microscope. A longitudinal section of the leaf and one of its cavities is shown in the annexed figure (*fig.* 31.), and a cross section exhibiting all the cavities divided in the middle, with their papillæ, at *fig.* 32., all much magnified. The only opening into the cells is between the involuted lower portion of the leaf and the leaf stalk, and is so narrow and completely concealed as to elude observation. It may, however, be detected in a thin longitudinal section of the leaf, and is seen in *fig.* 32. As the cuticle of the scales is not perfo-

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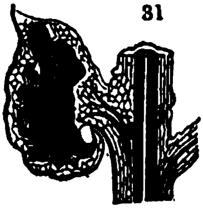

rated by any absorbing or perspiring pores, the author con-

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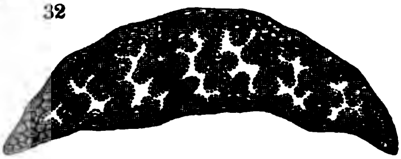

tends that their office is performed by the papillæ, and therefore that the imbricated scales are real leaves. "In the case of the Lathræ`a, where they (the leaves) are destined to perform their functions, not only in the dark, but buried in the earth, such an arrangement (the general law) would have been inexpedient; it is therefore substituted by another, admirably adapted to their peculiar circumstances and situation. Had the cuticle been furnished with air valves, the soil would have continually clogged and impeded their office; they are therefore removed by a contrivance, as beautiful as wise, and placed within the convoluted chambers excavated for them in the interior of the leaves, where they perform, securely and unseen, their destined office."

In the course of this able and interesting paper, the author dissents from the general opinion that the sickly colour of this and other parasites is to be attributed to their growing in the shade, as some suppose, or is a consequence of their parasitical condition, as Linnæus asserts, or of both combined; and maintains that the total absence of green arises, at least as much, from their wanting true leaves and a cuticle perforated with absorbing and perspiring pores. To support this view, he instances two parasites of British growth: one of which, *Cúscuta* europæ`a, dodder, is destitute of leaves, and has not a tinge of green, though growing in the full light; while the other, *V*íscum álbum*, mistletoe (perhaps the most strictly parasitical plant we have), is furnished with leaves, and is green.

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* As connected with this subject, and as exciting to further research on the plants adverted to, it may be worth the space here to present a remark which Mr. Bowman expresses in a note at the foot of p. 410.: —

"I have observed that the mistletoe dies with the tree on which it grows; and, from a notice in the Magazine of Natural History, vol. ii. p. 294. [by our correspondent L. E. O.], it seems that the Lathræ`a Squamària does so too. It has long been doubted whether Listèra Nìdus àvis [Neóttia Nìdus àvis of Swartz] be strictly parasitical. Whatever it may be in the earlier stages of its growth, it certainly is not so in its more advanced state. If it be carefully got up in a clod, and the soil afterward washed from around it, the leaves of the central root or caudex may be seen to terminate in a short curved spur, which tapers to a fine point, and evidently is not attached to any other vegetable. The cuticle of the stem and it bracteas have no perspiring pores."

REVIEWS.

Art. I. *The British Naturalist; or, Sketches of the more interesting Productions of Britain and the surrounding Sea, in the Scenes which they inhabit; and with relation to the General Economy of Nature, and the Wisdom and Power of its Author.* Vols. I. and II. 12mo. London; Whittaker, Treacher, and Co.; 1830.

We take shame to ourselves for having so long neglected to notice this interesting little work, the first volume of which has been lying on our table, unheeded, we blush to say, for more than a year and a half! We can assure the author we intended no disrespect to him by this delay; a delay, indeed, which we the less regret, as it enables us to "kill two birds with one stone;" or, in other words, to introduce our readers to the second volume also, which we have now received. Tardily, however, as we have at last entered on the task, we must content ourselves even now with taking but a slight and hasty glimpse at the work before us. Our limits would absolutely forbid us from following our author step by step in all his rambles

> "O'er moss and moor, by mountain and by flood;"

and, besides, our wish is, to prevail on our readers to go to the book itself, rather than allow them to put up with what at best must necessarily be but an imperfect and garbled account of its multifarious contents. Works on natural history, both of the scientific and the popular cast, calculated respectively for the use of the learned few and of the unlearned many, have abounded in the present day; and the circumstance may be regarded as at once both a proof of the increasing taste for the study of nature, and in great measure as the promoting cause of such increase. Without drawing invidious comparisons between the respective merits of these two distinct classes of literary productions, or praising one at the expense of the other, suffice it to say, once for all, that we think each very good and very useful in its way. "I admit," says the writer, in his preface, "the merit of the systems and subdivisions: for those who devote themselves to a single science, they are admirable; but to the great body of the people they are worse than useless." So far from decrying scientific works, we take the greatest delight in them; yet at the same time we profess ourselves admirers of the Selborne school. Wishing to see a love of nature become more general and diffused, and convinced as we are "how delightful and how profitable it would be, if all would be their own naturalists, and go to the living fountain instead of the stagnant pool," we hail with satisfaction the appearance of any work which has a tendency to create and foster a taste for natural history in these kingdoms. Just such a work is the *British Naturalist.* Addressed, as it were, "ad populum," and put forth in a form intelligible to all, the book can hardly fail of attracting the favourable attention of the public, and obtaining a very extensive circulation. We are pleased also with the general tone of good feeling which pervades the whole. In the introductory chapter, which contains many excellent and judicious remarks, the student is directed to the proper end and object of his studies in the field of nature, the knowledge and adoration of God. We extract the concluding paragraph of this portion of the work: —

> "The only sure way to become naturalists, in the most pleasing sense of the term, is, to observe the habits of the plants and animals that we see around us, not so much with a view of finding out what is uncommon, as of being well acquainted with that which is of every-day occurrence. Nor is this a task of difficulty, or one of dull routine. Every change of elevation or exposure is accompanied by a variation both in plants and in animals; and every season and week, nay, almost every day, brings something new; so that, while the book of nature is more accessible and more easily read than the books of the library, it is at the same time more varied. In whatever place, or at whatever time, one may be disposed to take a walk; in the most sublime scenes, or on the bleakest wastes; on arid downs, or by the margins of rivers or lakes; inland, or by the sea-shore; in the wild or on the cultivated ground; and in all kinds of weather and all seasons of the year; nature is open to our enquiry. The sky over us, the earth beneath our feet, the scenery around, the animals that gambol in the open spaces, those that hide themselves in coverts, the birds that twitter on the wing, sing in the grove, ride upon the wave, or float along the sky, with the fishes that tenant the waters, the insects that make the summer air alive; all that God has made, is to us for knowledge, and pleasure, and usefulness, and health; and when we have studied and known the wonders of His workmanship, we have made one important step toward the adoration of His omnipotence, and obedience to His will." (p. 38, 39.)

After the introduction, which we recommend to the attentive perusal of our readers, the subject matter of the remaining portion of the first volume is distributed into six heads, or chapters, under the respective titles of the Mountain, the Lake, the River, the Sea, the Moor, and the Brook. This plan, it is intimated, has been adopted in order that the subjects might be "viewed in those masses into which we find them grouped in nature; the plant or the animal having been taken in conjunction with the scenery, and the general and particular use; and, when that arose naturally, the lesson of morality or natural religion." The boundaries thus prescribed could not, it is evident, be very rigidly adhered to; and, accordingly, our author, in his descriptive narrative, rambles about "ad libitum" from one object to another, just as we should have been disposed to do ourselves, had we actually performed, amid the wilds of nature, these very excursions, which are here only presented to the imagination. The consequence is, that subjects are occasionally introduced into each department, which might with equal, or perhaps greater, propriety, have been treated of under some other. This, however, if it be an evil at all, is but a trifling one; and as the plan of the work is at any rate simple, natural, and inartificial, we shall not quarrel with it on that score. But not to tarry longer at the threshold, we shall enter at once "in medias res," and proceed to point out what we conceive to be some of the beauties and some of the errors of the volumes before us.

In the second chapter, "The Mountain," i. e. the first after the introduction, some interesting particulars are given relative to the history of the wood-cat, which, our author strenuously contends, is a distinct species from the common or domestic kind. We are not prepared to deny this position, in the face of authority which appears to be grounded on knowledge and experience of the subject; though hitherto we have always been accustomed to follow the vulgar opinion, that the one is only a variety of the other. And still we would ask — Is there more difference between our domestic favourite and its prototype of the woods, than is reasonably to be looked for in the case of two animals in such widely different conditions? "Among domesticated animals," it must be admitted, "colour proves nothing:" but as to size, habits, and dispositions, is there not found as great a discrepance between individuals of the domestic variety, as exists between the generality of these and the wild cat? Some, for instance, are docile, gentle, and fondling in the extreme *; while others,

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* Cats are generally said to be attached to places, not to persons; and the remark, in the main, may be true enough. We have known many instances, however, of their showing a marked and decided preference for particular individuals. In one instance a cat attached herself inseparably to a labourer in our employ, attending him at his work, and lying on his coat like a dog; and retiring at intervals to the barn or the shrubbery, &c.,

treat them how you will, are ill-tempered and untamably ferocious. One, again, is an expert and assiduous mouser, destroying not only the murine and feathered race, but insects, reptiles (e. g. snakes), bats, hedgehogs, and even the more formidable and hard-bitten weasel.* Another is sluggish and inactive, almost destitute of the usual predatious propensity, and altogether useless in its own profession. Strange as it may at first appear, it is a most difficult task in some cases to trace with accuracy our domesticated animals to their true and undoubted origin. In the present instance we confess we hesitate to give a decided opinion, and should be glad of a little further information. The wood-cat is here represented as

> "rather a dangerous animal to catch in a trap, as it is very tenacious of life; and the moment it is loosened it springs and fastens with great fury. For the same reason, it is dangerous to wound or even to irritate it; and if it cannot be killed outright, the safest way is to let it alone." (p. 47.)

Is not the peril of encountering this tiger of the British forests a little overcharged?

As we offer our remarks in the same order in which the passages which suggest them occur, we must be excused if we appear to jump rather abruptly from the consideration of animals to that of plants, and back again from plants to animals. In ascending the "mountain," our naturalist, as might be expected, meets with several species of *V*accínium, of which there are four indigenous to Britain; viz. *V*accínium uliginòsum, the great bilberry (by far the least common of the whole); *V*. Myrtíllus, the common whortleberry or bilberry; *V*. *V*itis Idæ`a, the red whortleberry or box-leaved bilberry; and *V*. Oxycóccos (or, according to more modern nomenclature, Oxycóccos palústris), the true cranberry. These plants are each of them distinguished by such well-marked characters, that there can, to a botanist at least, be no such thing as mistaking one for another. At page 57. not a little confusion appears to be unnecessarily made, owing to the names, either Latin or English, which are there applied to one or more of the above species. "The beautiful myrtle-

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for mice or birds, which, when caught, she brought and laid at his feet, sometimes to the number of six or eight, or more, in a day. She would accompany him when he went a-field, through wet grass, to fetch up the cows to the yard; and has been known to follow him from her proper residence (in spite of repeated efforts to drive her back) to his own house, a distance of near two miles, and, remaining there the night, return with him in the morning as he came back again to his work.

* All the above-named animals we have known to have been destroyed favourite cat of our own.

leaved bilberry" is designated by the specific name "montànum," instead of its good, old, appropriate one, Myrtíllus, which, by the way, is adopted for the plant at page 165. of the second volume. Why this unnecessary and (as we believe) unauthorised change of name, calculated to mislead the young, and perhaps somewhat perplex the more experienced botanist? In the same page (57.) "*V*ìtis Idæ̀a" (it should have been written "*V*accínium *V*ìtis Idæ̀a") is called the "cowberry;" which, though we never heard it before, may, for aught we know to the contrary, be one of its provincial appellations. "The bush," says our author, "is low and hard, and so is the berry, which, notwithstanding its fine red colour, is generally left to the birds." We can tell him from our own experience, that, in spite of its inferiority in size, and different appearance, it is not unfrequently gathered for sale, and passed off upon those who know no better, — the experiment has been attempted upon ourselves, — for the genuine cranberry; and though vastly inferior to that in size, and flavour, and juiciness, it is yet no contemptible fruit for tarts. Again, we read, "In the bogs, at about the same elevation, the cranberry, or crowberry (Oxycóccos palústris), is very frequently met with, but it is harsh and austere." Now, the English name "crowberry" is appropriated to a very different thing, *E*′mpetrum nìgrum, a diœcious plant, whose foliage much resembles that of the heaths (*E*rìcæ); and, though it may possibly be a local appellation for the cranberry, would have been better omitted, for the sake of avoiding confusion. It ought to have been added, too, that although the fruit of the cranberry may be (as stated, and as its name implies *) "harsh and severe" when eaten raw, it has an excellent flavour, and is highly and most deservedly esteemed, when preserved and used in confectionary. It is proverbially said, that "there is no disputing about tastes;" and therefore we have no right, perhaps, to call in question that of the author, for preferring the fruit of the cloudberry (*R*ùbus Chamæmòrus) to that of the Swedish bramble (*R*ùbus árcticus); and yet this preference does not a little surprise us.

> "The dwarf crimson bramble," we are told, "and more frequently the luscious cloudberry (*R*ùbus Chamæmòrus), are found fast by the margin of the snow, as the limit of vegetation. The first of these is a very pleasant fruit; but even in the bleakest parts of Scotland it is rare, and it is not very plentiful even in Lapland †; but the cloudberry is more abundant, and

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* The specific (or, as it is now become, the generic) name, Oxycóccos, is derived from *oxys*, sharp or sour, and *kokkos*, a berry.

† Is not this directly at variance with the testimony of Linnæus, who, though he calls it "rarissima planta," a very rare plant, immediately adds,

it is much better. The fruit is single, upon the top of a footstalk, and in form, size, and colour [!] it is not unlike the mulberry, after which it is partly named; but in flavour, taking the place where it is found into consideration, it is superior to all the mulberries that ever grew." (p. 62.)

This is surely rather a high-flown encomium on the cloudberry; nor is it correct to compare the fruit in size and colour, and still less, we think, in flavour, to its half namesake, the mulberry. We have ourselves slaked our thirst, ere now, with this ethereal berry, when exploring the snow-capped summits of the Scottish mountains, and well know how grateful to the palate, and how refreshing, on such occasions, even a far inferior fruit may prove. More frequently have we been regaled, from the garden, with the high-flavoured and fragrant berry of *R*ùbus árcticus; a berry so fragrant, indeed, that if a few only be gathered in a saucer, and brought into the house, they perfume almost the whole room. * And we must say that, to us at least, this latter fruit, when put in competition with its rival, is, in point of flavour, as "Hyperion to a satyr." Could it be readily produced in sufficient quantities, it would form a valuable addition to our desserts; and in

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"occurrit copiose per Lapponiam desertam, præsertim ad tuguria et casas Lapponum?" (*Flora Lapponica.*) "It grows abundantly in the wild parts of Lapland, especially near the huts and cottages of the Laplanders." Again, in his *Lapland Tour*, he says, "I wish those who deny that certain plants are peculiar to certain countries could see how abundantly the birch, the Lapland willow, the strawberry-leaved bramble (*R*ùbus árcticus), &c., flourish in this district [Pithoea]." (*Lachesis Lapponica*, vol. i. p. 203.)

* "Baccæ omnibus Europæis fructibus fragranti odore saporeque palmam præripiunt." (*Linnæi Flora Suecica.*) "The berries [of *R*ùbus árcticus] surpass all European fruits in fragrance of scent and flavour."

The editor of the *Lapland Tour* (Sir J. E. Smith), speaking of *R*ùbus Chamæmòrus, observes, in a note: "The árcticus is a much more valuable plant for its fruit, which partakes of the flavour of the raspberry and strawberry, and makes a most delicious wine, used only by the nobility in Sweden." (Vol. i. p. 52.) "Confici curant magnates per Norlandiam e baccis syrupum, gelatinam, vinum rubeatum, &c., quæ partim ab illis ipsis consumuntur, partim Holmiam ad amicos mittuntur, tanquam bellaria suavissima, rarissimaque; et sane inter omnes baccas Sueciæ sylvestres videntur hæ tenere primas." (*Fl. Lap.*) "The nobility in Norlandia cause to be made of the berries syrup, jelly, bramble wine, &c., which are partly consumed by themselves, and partly sent to their friends at Stockholm, as the most choice and delicious dainties; and, indeed, among all the wild berries of Sweden, these seem to hold the first place." The pretty compliment Linnæus pays to this little plant is worthy of being recorded: — "Ingratus essem erga beneficam hanc plantam, quæ me toties fame et cursu fere prostratum vinoso baccarum suarum nectare refocillavit, si ejus integram non exhiberem descriptionem." (*Fl. Lap.*) "I should be ungrateful towards this excellent plant, which has so often refreshed me with the nectareous juice of its berries, when almost overcome with hunger and fatigue, were I not to give a complete description of it." He then proceeds to give a minute description of the plant and its several parts.

these days of horticultural improvement * it might be worth while to try the experiment, by bestowing on this beautiful little flower some extra care in the cultivation, with a view to increase the produce of its fruit, and thus combine the useful with the agreeable.

We must now turn to a different subject. Our author's forte lies evidently in ornithology. In this department of natural history he seems to have made deep and accurate research. Accordingly, we are presented throughout these volumes with many interesting remarks, and much useful information, the result, as it appears, of close personal observation, on the subject of British birds. In particular, his remarks on the eagles, and the larger birds of prey, are the more valuable, inasmuch as these species constitute some of the least accessible subjects in natural history. The birds themselves are, many of them, of rare occurrence; and, even when met with, are to be seen, perhaps, but for a few moments in passing. They suffer us not to approach them near: and consequently are difficult to be procured for minute examination. They differ, too, in many cases, so much in their plumage, according to sex or age †, that the greatest confusion has prevailed respecting their several species, which even yet, perhaps, have not been thoroughly ascertained. We cannot now enter into particulars, but incline to think that the reader of the *British Naturalist* will find considerable light thrown on this subject at p. 113, &c.

In treating of the golden eagle, our author has been tempted, in an evil hour, we think, to introduce the story of Hannah Lamond; whose infant (so the tale goes) was snatched up by an eagle, and carried off to the eyry, but rescued again, *mirabile dictu!* safe and sound, by the mother herself, whose maternal feelings roused her to such a pitch of physical strength and boldness as to enable her actually to scale a hitherto inaccessible cliff, which even Mark Steuart, the sailor, turned his back upon and attempted in vain! This, no doubt, is a very pretty story, and affectingly told (we have even seen tears shed at the narration), but, unfortunately, it is wholly incredible. Such a tale might have cut a figure in some fashionable novel; but is, we presume to think, quite out of place in a grave work on natural history. Surely there is enough to engage our interest and excite our admiration really to be found in nature, without having recourse to the marvellous and fictitious. We must protest against such clap-traps, introduced merely *ad captandum vulgus*, at the expense of all truth and probability. Should the work go, as we hope it will, to a second edition, we trust the author will, for his own sake, have the good sense to erase this fable from his pages, unless he be content to rank among those

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* Linnæus says it is difficult of cultivation, and commonly proves barren in the gardens: — "In hortis non facile colitur, et communiter sterilis evadit." (*Fl. Lap.*) We have ourselves found it thrive very well, and spread itself when planted in peat soil; nor has it proved shy of bearing fruit.

† "Ætate sexuque variant." (*Linnæi Systema Naturæ.*)

> ——— "who greedily pursue
> Things that are rather wonderful than true;
>
> . . . . .
>
> Make nat'ral history rather a gazette
> Of rarities stupendous and far-fet;
> Believe no truths are worthy to be known,
> That are not strongly vast and overgrown." *

As fair specimens of our author's style, we extract from the third chapter the following valuable passages on the beauty and the use of lakes; observing, as we pass, that he is always for pointing out, as far as discoverable, the end and object, the good effected, by any phenomenon in nature: —

"To the enthusiast in the picturesque, nature no where presents an aspect of such varied beauty as amid these combinations of hill, and water, and glade. That monotony which characterises a wide expanse of unbroken plain, even when clothed in a mantle of uniform hue, and that unrelieved sense of awe and loneliness which a mountain range, without this soothing accompaniment, is apt to suggest, are alike absent here. All that is most sublime is softened by all that is most beautiful, and all that is most beautiful is elevated by all that is most sublime. The pervading and perpetual presence of water clothes the earth in its richest robe of verdure; and there is a spirit of life and motion over all, which prevents that feeling of oppression and melancholy with which man finds himself bowed down in the immediate presence of nature, in her mightier agencies. The air is full of soothing sounds, poured from a thousand natural sources; the ripple of the mimic wave upon the mimic beach; the murmur of the cascade; the roaring of the cataract; the sighing of the breeze, or the rushing of the blast among the rocking woods, all blend into one wild but enchanting harmony, repeated by a thousand voices, from hill, and grove, and glade, that it might well suggest a mythology like that of the Greeks of old, and lead the imagination to people every cliff, and stream, and tree with a dryad or a faun." (p. 96.)

After noticing the fertilising effects of lakes, and the more equable temperature produced by their presence, the author thus proceeds: —

"But lakes in mountainous countries have another advantage; they prevent those floods of the rivers which are so destructive where there are no lakes; and if they be in warm latitudes, they prevent the soil from being burnt up and becoming desert. Rains fall with greater violence upon varied surfaces than upon plains, because there the atmosphere is subject to more frequent and rapid changes; the slopes of the surfaces precipitate the water sooner into the rivers, and thus the rain passes off in an over-

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* Butler's "Elephant in the Moon," l. 527.

> whelming flood. By the interposition of lakes this is prevented: they act as regulating dams; the discharging river cannot rise higher than the lake; and thus when the lake is large, a flood which otherwise would flow off in a day, and destroy as it flowed, is made to discharge itself peaceably in weeks. Besides the preventing of devastation, this is of advantage to the country. When the flood passes off, while the rain is falling, and the air is moist and not in a state for evaporation, the land derives but a small and temporary advantage from the rain: but when the water is confined till the state of the atmosphere changes, a considerable portion of it is taken up by the process of evaporation, and descends in fertilising showers. A decisive proof of the advantage of lakes, and the casualties that result from the want of lakes to regulate the discharge of mountain rivers, was unfortunately given in the floods in Scotland, in the summer of 1829. The whole of the rivers that flow eastward from the Grampians have steep courses, but no lakes to regulate their flow; and the consequence was, that they threw down the bridges, flooded the fields, washed away the soil and crops, and did other damage; while those streams farther to the north, that roll an equal or a greater mass of water, but which are expanded into lakes, did no harm. Mountainous countries, in which there are no lakes, are usually barren, or in the progress of becoming so. The Andes in America, the ridges in Southern Africa, and many other lakeless elevations, are utterly sterile. The mountains of Scotland, and even those of the north of England, have little beauty where there are no lakes; they are covered with brown heather, unbroken by any admixture, save dingy stone and red gravelly banks, where the rains have torn them to pieces. There are none of those sweet grassy dells and glades, and none of those delightful thickets, coppices, and clumps of trees, that spot the watered regions." (p. 99—101.)

In celebrating the praises of the Bala Lake, within a page of the foregoing extract, our naturalist, mounting his Pegasus without a curb, becomes quite poetical and enthusiastic.

> "Bala," he says, "though designated by the humble name of a pool, is capable of softening down the fiery spirit of the Cambrian, as he gazes on it from the mountain's ridge; and the waters are so limpid, that 'the lasses of Bala,' by laving their beauties in it on May-morn, excel in brightness all the other daughters of the principality." (p. 102.)

We mean no offence to the "lasses of Bala," whose charms we shall not call in question; but it requires a spirit of gallantry far beyond what we profess to be possessed of, to put implicit faith in such statements. In short, we consider such effusions as no better than downright trash. The following passage is in better taste, and more consistent with sober truth and reality: —

> "The most apparently trivial habits of organised bodies are just as demonstrative of infinite wisdom, as those that attract the vulgar by their novelty, or by some real or fancied resemblance to the marvellous among mankind. The times at which the heron resorts to the water to fish, are those at which the fish come to the shores and shallows to feed upon insects, and when, as they are themselves splashing and dimpling the water, they are the least apt to be disturbed by the motions of the heron. The bird alights in the quiet way that has been mentioned; then wades into the water to its depth, folds its long neck partially over its back, and forward again, and with watchful eye awaits till a fish comes within the

range of its beak. Instantaneously it darts, and the prey is secured. That it should fish only in the absence of the sun, is also a wonderful instinct. Every one who is an angler, or is otherwise acquainted with the habits of fish in their native element, knows how acute their vision is, and how much they dislike shadows in motion, or even at rest, projected from the bank. It is not necessary that the shadow should be produced by the bright sun; full daylight will do it; and we have seen a successful fly-fishing instantly suspended, and kept so for a considerable time, by the accidental passage of a person along the opposite bank of the stream; nay, we once had our sport interrupted by a cow coming to drink; so alarmed are fish, especially the trout and salmon tribe, at the motion of small shadows upon the water, though shadow, generally speaking, be essential to their surface-operations. They do not feed, and therefore we may conclude that they do not so well discern [?] small bodies upon the surface, when the sun is bright. Fishes are, in fact, in part, nocturnal animals; and the heron, that lives upon them, and catches them only in their feeding-places, is partially, also, a nocturnal animal. There is one case in which we have observed herons feeding indiscriminately in sun and shade; and that is, when a river has been flooded to a great extent, and the flood has passed off, leaving the fish in small pools over the meadows. How the herons find out these occasions it is difficult to say; but we have seen several pairs come after a flood to a river which they never visited upon any other occasion, and within many miles of which a heronry, or even the nest of a single pair, was never observed." (p. 106—108.)

"The case char (*Sálmo alpìnus*)," we are informed, "is found chiefly, if not exclusively, in Winander-mere." If by this be meant the fish usually known by the name of char in the north of England (of which, however, from the account here given, we entertain some doubt), it occurs more particularly in Coniston and Buttermere lakes. The char which we have there seen has the eyes remarkably prominent; the back rises more into an arched form than that of the trout, and the belly is rather concave to correspond; so that the whole fish is in the form of a gentle curve, or a bow slightly bent. We did not know that our char ever entered the salt water. It certainly is a most excellent fish; superior, we think, to the trout, and deservedly esteemed, independently of its rarity. We apprehend our author must be speaking of a different species. The genus *Sálmo* still requires much investigation; the true diagnosis of the species being a perplexing knot in natural history, which has not yet been unravelled.

Variety, and species, and even genus, are terms continually used synonymously in ordinary conversation; and it is quite surprising to see how little their true meaning, as employed in natural history, is generally understood, even by people of education. But we should not have expected that an accomplished naturalist would have committed the vulgar blunder of confounding these terms: yet so it is. "Of the dragon fly (Libéllula)," we are told, "there are several varieties,"

&c. The author evidently means several *species.* True it is, that of some of these species, there are several varieties, especially in the smaller kinds, as A'grion puélla and Calépteryx vírgo (*Stephens*), each of which occurs of such totally diversified hues, that an inexperienced observer would at once suppose them to be so many distinct species.

A lively and accurate description of the most commonplace occurrence in nature never fails to afford pleasure in the perusal, just as a faithful sketch of some homely scene always gratifies the beholder. The following picture of the lashing of the beach by the waves of the sea is drawn to the life: —

> " Even when seen from the pebbly beach of a lee-shore, the ocean in a storm is a sight both to be enjoyed and remembered. The wave comes rolling onward, dark and silent, till it meets with the reflux of its predecessor, which produces a motion to seaward on the ground, and throws the approaching wave off its equilibrium; its progress is arrested for a moment; the wall of water vibrates, and as it now meets the wind, instead of moving before it, its crest becomes hoary with spray; it shakes, it nods, it curls forward, and for a moment the liquid column hangs suspended in the air; but down it dashes in one volume of snow-white foam, which dances and ripples upon the beach. There is an instant retreat, and the clean and smooth pebbles, as they are drawn back by the reflux of the water, emulate in more harsh and grating sounds the thunder of the wave." (p. 206.)

They who doubt (for such we believe there are) the specific difference between the herring and the pilchard, will find some ready marks of distinction between the two pointed out at p. 282.

> " In the pilchard, the dorsal fin is placed exactly over the centre of gravity, so that if the fish be suspended by it, the body hangs in a horizontal direction. In the herring, it is placed farther back than the centre of gravity, so that the head droops when the fish is lifted by it. The same distinction holds in the fry as well as in the full-grown fish. The fry of both are taken in great numbers, and known by the common name of sprats."

We shall detain our readers only a little longer with any remarks on the contents of the first volume; but we cannot refrain from pointing out what we conceive to be a palpable error on the subject of that amusing bird, the swift. " The nest," says the *British Naturalist* (p. 365.), " is constructed much in the same manner as that of the common swallow." Now, the swallow's nest, it is well known, is a neat piece of masonry, composed externally of much the same materials as that of the marten; that is, of mud or clay: but as the swift, by choice at least, never settles on the ground, and, if it does by accident, is scarcely able, from the shortness of its legs * and the length of its wings, to rise again into the air, we are at a loss to conceive how it can collect mud or clay for the purposes of nidification: nor is the fact so; for the swifts' nests which we have examined in the days of our youth were loose and slovenly structures, composed chiefly of feathers and such other substances as might be collected by the bird in the air. We never detected the swift in the act of "pulling grass, feathers, &c., very dexterously from other birds," and therefore cannot speak to the point; but that such may be the case is by no means improbable.

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* The specific name, *A'*pus, signifies *without feet.*

Entomology is a department of natural history in which our author appears to have made no very great proficiency. He speaks (p. 366.) of moths being "always indolent." Doubtless, like all other animals, they are so, when at rest; and the majority of moths being nocturnal insects, the period of rest to them is during the daytime: but many *Phalæ*`næ fly abroad by day as well as by night, and evince no inconsiderable activity and power of flight. Every person of the least observation must have witnessed the evolutions of the common golden Y moth (*Nóctua* gámma) for example, which visits our gardens all through the summer, and to a late period of the autumn, hovering about the flowers that are still in bloom, somewhat in the manner of the humming-bird sphinx (Macroglóssa stellatàrum), inserting its proboscis into the blossoms, and adroitly extracting the nectareous juices, while it poises itself on the wing.

The second volume of the *British Naturalist*, to which we now advert, contains (besides a short introduction) three parts severally entitled the Year, Spring, and Summer. We have quoted so largely from the first volume, that we must endeavour to be somewhat more sparing in our extracts from the second. We cannot, however, resist the inclination we feel to transcribe the following rather lengthened passage, as it lays the axe to the root of a very prevailing and obstinate vulgar error: —

"There is nothing more common than to predict the future state of the season, from some single appearance in the early part of it; and yet there is nothing more unphilosophical or fallacious. An early blossom, an early bee, or an early swallow, or the early appearance of any other production of nature, is no evidence whatever of the kind of weather that is to come, though the belief that it is so is both very general and very obstinate. The appearance of these things is the effect of the weather, not the cause, and it is what we may call an external effect; that is, it does not enter into the chain of causation. The weather of to-day must always have some influence upon the weather of to-morrow; but its effects will not be altered in the smallest tittle, whether it does or does not call out of the cranny in which it has been hybernated, some wasp, or some swallow that was too weak for the autumnal migration. Birds, blossoms, and butterflies do not come in expectation of fine weather; if they did, the early ones would show that they see not far into futurity, for they generally come forth only to be destroyed. They come in consequence of the good weather which precedes their appearance, and they know no more of the future than a stone does. Man knows of to-morrow only as a rational being; and were it not that he reasons from experience and analogy, he would have no ground for saying that the sun of to-day is to set. The early leaf and the early blossom of this spring may be a consequence of the fine weather of last autumn, which ripened the wood or forwarded the bud; and the early insect may be evidence that the winter has been mild: but not one of these, or any thing connected with plants or animals, taken in itself, throws light upon one moment of the future; and for once to suppose that it does, is to reverse the order of cause and effect, and put an end to all philosophy — to all common sense.

"And are we to draw no conclusions from the phenomena of plants and animals, which have been popular prognostics of the weather from time immemorial; not from the face-washing of the cat, or the late roosting of the rook, which have been signs infallible time out of mind? No, not a jot from the conduct of the animals themselves; unless we admit that cats and crows have got the keeping and command of the weather. These actions of theirs, and very many (perhaps all) phenomena of plants and animals are produced by certain existing states of the weather; and it is for man to apply his observation, and find out by what other states these are followed. The cat does not wash her face because it is to rain to-morrow; that, in the first place, would be "throwing philosophy to the cats;" and, in the next place, it would be doing so to marvellously little purpose, inasmuch as, if puss were thus informed of the future, she would only have to wait a day in order to get a complete washing without any labour or trouble. When the cat performs the operation alluded to, it is a proof that the present state of the atmosphere affects her skin in a way that is disagreeable, and the washing is her mode of relief; and, in as far as the cat is concerned, that is an end to the matter. Man, however, may take it up, and if he finds that in all cases, or in the great majority of cases, this happens only before rain, he is warranted in concluding that the state of the atmosphere which impresses this action upon the cat is also the state which precedes rain; and that in the cases where the rain does not follow, there has been a subsequent atmospheric change, which is also worthy of his study.

"What it is in this case, and whether connected with the little action in the fur of the animal by which electricity can be excited, we shall not enquire; but in the late roosting of the crows [rooks?] the cause is apparent: they feed upon larvæ and earth-worms; these, especially the latter, come most abroad in the evenings before rain; and, as most animals gorge themselves where food is easily found, there is no reason why rooks should not follow the general law.

"These familiar instances have been noticed in order to point out how apt we are to miss the lesson that nature would give, and break down the fabric of philosophy, by giving a purpose and a prescience of the future to that which cannot reason." (p. 86—89.)

Allusion is made again to the same subject at p. 240.: —

"The appearance and first song of birds are, like all other seasonal phenomena, part of the history of the year, and of value retrospectively in telling what has been, though not of the smallest use in telling what is to be."

There are few greater impediments to the progress of knowledge and the discovery of truth, than an implicit reliance on the dicta of high authorities. The idle habit of too readily assenting to the assertions of others, without investigation of the subjects themselves, checks at once the spirit of research and enquiry, and serves oftentimes to confirm and propagate a belief in the grossest errors. Men of eminence as naturalists have maintained, as it were, "ex cathedra," that swallows retire under water at the approach of winter, and remain in that element till the ensuing spring *, that hawks keep truce with lesser birds and poultry during the season of the cuckoo's singing †, in order that these may enjoy leisure while building their nests, hatching, and rearing their broods; and there are still to be found those, in whose minds these and similar opinions obtain credence. We have very lately been gravely told that cuckoos remain dormant in this country, and are to be met with during the winter rolled up in moss and leaves in the holes of banks, &c. Our author, however, is one (and we hope his example may become more general among the fraternity of naturalists) who, instead of taking things entirely upon trust, chooses to think and believe for himself:—

"Nullius addictus jurare in verba magistri,"

he prefers looking at nature, and listening to her, with his own eyes and ears, and forming his opinions accordingly, rather than putting up with the reports of others, and believing just what he is told to believe. We find him, accordingly, a little sceptical as to some points in the natural history of the cuckoo, which, though anomalous and extraordinary in the highest degree, are yet universally credited.

"We have no wish," he observes, "to offer any decided opinion on the singular propensity alleged of the cuckoo, that the female generally deposits her eggs, one by one, in the nests of small birds, where they are hatched by their foster-mothers, and fed by them till they thus are fledged; in the course of which time, they most ungratefully eject their foster-brothers and sisters from the nest. In the face of the many grave and learned authorities by which this is stated, it would not become us to give an opinion; all that we can positively say is, that, although we have seen very many young cuckoos in nests, sometimes two, but never more in any one nest, and generally only one; and although we have seen them in nests disproportionally small, and of the same structure as the nests of smaller birds, we have never met with the egg of the cuckoo along with that of any other bird, have never scared a little bird from the act of in-

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* "Hirundo rustica unaque cum urbica autumno demergitur, vereque emergit." (*Linnæi Systema Naturæ.*)

† "Paciscuntur inducias cum avibus, imprimis domesticis, quamdiu cuculus cuculat, ut hæ feriantur sub nidificatione, incubatione, pullitie." (*Id.*)

cubation in a cuckoo's nest, and never have detected one little bird in the act of feeding a cuckoo, either in the nest or out of it. We do not say that these matters cannot, or even that they do not, happen; we merely say, that we have never seen them. When we enter upon study where there are facts to appeal to, we must really be on our guard against names, however eminent, or however deservedly they may be so." (p. 131.)

Again: —

"We are not denying the common theory of the cuckoo; but we repeat, that in the course of a great deal of observation, we have not met with a single fact which could not be fully and perfectly explained, upon the hypothesis which the anatomy of the cuckoo, and the analogy of all the rest of the feathered tribes suggests; namely, that the cuckoo often takes possession of the nests of other birds, either after these had quitted them, or after it had made a meal of the eggs, and then performs all the incubation and nursing itself." (p. 134.)

We must leave our readers to form their own opinions, or, we would rather say, to institute their own experiments, on this curious subject; reminding them, that the only infallible method of arriving at the truth, and setting the question at rest, is a close attention to the facts which Nature herself presents. For "denying without proof, in natural history, is just as bad as asserting without proof."

Some very interesting remarks on the habits and manners of "the crow tribe" occur at p. 154, &c.; but they are too long for extraction, and we must refer our readers to the work itself: just recording our opinion, as we pass, in unison with that of the author, that "probably the good that is done by the whole race more than counterbalances the evil; and experience has shown that with the rook this is really the case."

That most extraordinary, thrilling, vibratory noise (we scarcely know what else to call it) which is emitted by some species of woodpecker, especially the smaller or spotted kinds, and which, familiar as it is to our ears, we yet never hear without stopping to listen in astonishment, is, with great probability, we think, considered by the *British Naturalist* as the love-note of the bird.* We are led to this opinion by the circumstance of our almost invariably hearing the sound near our own residence, for a short period in the spring (March and April), and never, to the best of our recollection, at any other season. We have watched the bird during the operation, at the distance only of a few yards; but are still at a loss to understand exactly how the sound is produced: the strokes of the bird's bill against the tree, rapid though they be, falling far short, as it appeared to us, of the almost incredible celerity with which the sounds were repeated. Perhaps we do not make ourselves understood: our meaning is, that if the stroke of the beak be supposed to be repeated, say four or five hundred times in a minute, the sound produced appears to require that it should have been repeated twice or three times as often in the same space: in a word, the noise which falls upon the ear, seems far more rapid than the tapping of the beak which is visible to the eye. May not the horn-tipped tongue of the bird, as well as its bill, come at the same time in sonorous contact with the wood, so as to produce at every stroke a double sound? We throw out this hint merely in order to invite enquiry on this curious subject; and for the same reason, need make no apology for transcribing our author's remarks, which are just, and highly descriptive of the phenomenon in question.

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* Linnæus, if we understand his meaning right, seems to intimate that this noise is made by the woodpecker for the purpose of frightening the insects, and causing them to come forth from the wood. This, however, we very much doubt. As the birds destroy timber-boring insects, and never pierce perfectly sound wood, they may be considered beneficial animals, and ought not to be unjustly proscribed, as they often are, on account of the supposed injury they do to timber. "Pici larvas insectorum lignum intus rodentium, rostro secante, sono stridulo terrefaciente, auditu percipiente, lingua acuta hastata intrante extrahunt, injuste proscripti." (*Systema Naturæ.*)

> "It is not a little singular that the love-note of the woodpecker should not be a voice, like that of most other birds, but a tapping upon the trunk of a tree. The muscles of the neck of the bird are so constructed, that it can repeat the strokes of its bill with a celerity of which it is difficult to form a notion. They absolutely make one running jar, so that it is impossible to count them. We have often tried with a stop-watch, but could never ascertain the number for a minute, although we are certain that it must be many hundreds; and as, from the sound, the space passed over must be at least 3 inches backwards and as much forwards, at every stroke, which, in the rude estimate that we were able to form (and it was a very rude one), would make the motion of its beak, one of the most rapid of animal motions, nearly 200 miles in the hour, yet the bird will continue tapping away for some considerable time." (p. 293.)

Such, indeed, is the rapidity of the motion, that, were its powers of wing in proportion to those of its neck, the bird might almost vie with Puck, and

> ——"put a girdle round about the earth
> In forty minutes." *Midsummer Night's Dream.*

There are some unlucky animals in the creation, which, having once been most unjustly robbed of their good name and character, are for ever after persecuted by man with unrelenting rigour, while, in fact, they do him good and faithful service. The hedgehog, we believe, and the toad might be adduced as instances in point. But the race which we had more especially in our eye, and which drew the remark from us, is that of those amusing little birds the titmice. A price is frequently set upon their heads, even in these enlightened days; and incredible sums are sometimes expended and entered in the churchwardens' accounts for their destruction. So strong, indeed, and universal seems to be the prejudice against them, that it is next to impossible to persuade some people that, so far from being injurious, these birds are exceedingly useful.* It is with great pleasure,

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* The chaffinch is generally considered a most pernicious bird in gardens, and is treated accordingly. We once knew a market-gardener who used to say that "one chaffinch was well worth a charge of powder and shot." And it must be confessed, that it does commit considerable depredations among seed-beds, especially those sown with the seed of the cruciform or Tetradynàmia class of plants (radishes, turnips, cabbages, &c.), destroying the seed just as it is sprouting and coming up. In some cases, perhaps, even this operation may be beneficial, and may serve as a salutary thinning or pruning of the beds; seeds being very commonly sown too thick, and few owners having the courage to thin enough, either in the case of seed-beds, fruit, or any other crop. Be this as it may, however, the bird at all events destroys an enormous quantity of insects; and in this way makes amends for any injury it may do to our gardens in other respects. This opinion, we are happy to find corroborated on the authority of Mr. Main (see Vol. IV. p. 417.), who speaks of these birds as frequenting gardens, "where," says he, "they are useful, being, during summer, entirely insectivorous."

In the early part of last summer our attention was attracted by a chaffinch, which, as we sat in our room, we observed to pay repeated visits to a broom bush (*Spártium scopàrium*) immediately in front of our windows. The bird remained a considerable time in the bush at each visit, and appeared exceedingly busy about *something*, hopping from spray to spray, searching and rummaging among the branches, and evidently using its bill. We suspected that the object of plunder was the young soft seed of the broom, which at the time was much in the same state as peas are in, when fit to gather. Upon examination, however, we found every pod whole and untouched; but the bush was smothered with aphides; and these, we ascertained, (not the soft seeds, as we had supposed,) were what attracted the chaffinch. Whether the bird devoured the aphides itself while in the bush, or (as we rather suspect) carried them off for the purpose of feeding a young brood, we cannot say; but an immense number of aphides must have been destroyed during its repeated visits.

When any mischief is done in the garden, the orchard, the plantation, or on the farm, we are very apt too hastily to lay the blame on such animals as may happen, in pursuance of their usual habits, to be occupied in or near the spot where the mischief takes place. Frogs and toads have before now been accused of eating the strawberries, because they are often met with among the strawberry-beds. We have been told of a gentleman who charged the rooks with having stripped his oak trees of their leaves. That the oaks were nearly bare, was beyond dispute; and he had himself seen the rooks settling upon them by thousands, and pecking away right and left with their bills. War was therefore declared by the owner against the rooks, and good store of ammunition laid in for the occasion. But, fortunately for the "black population," before hostilities actually commenced, the gentleman was convinced by some one who stepped in, and knew more of natural history than he did himself, that the rooks were not in fault; quite the contrary; they had only flocked to the trees for the sake of devouring the myriads of cockchafers, and of the larvæ of moths, which were the real depredators. Every country gentleman, every gardener, every farmer, every person, in short, who owns or is occupied about therefore, that we find the *British Naturalist* standing up in defence of their character, and bearing his testimony in their favour. Common justice as well as humanity compels us to transfer his remarks on this subject to our own pages.

"The titmice are among the most active and courageous creatures of their size with which we are acquainted; and they are also exceeding useful to man; useful, indeed, in preventing the whole of the trees from being devoured by insects. In spring they are pruners, whisking about and cutting off opening buds with their strong conical beaks; and, though they be often blamed for that part of their economy, it is always an advantage, as they care not for the bud itself, but only for the worm that it contains, which worm would be certain to destroy that bud before it underwent its transformation, and might, in the course of the season, produce a progeny that would destroy thousands more. In the later period of the season, when the eggs of insects cease to be hatched in leaves, and new ones are deposited in the crevices of the bark, the habits of the titmice change, and they become tree creepers, running along the stems and branches in all directions with the greatest ease and rapidity, and clearing the crevices of every living thing that they can discover. There is no bird that it is more amusing to watch than a titmouse, when it is thus occupied; their motions are so lively, and they can run back undermost with the greatest ease." (p. 308, 309.)

"In a fruit country, the destruction of the great titmice would be about as wise and profitable as the extirpation of rooks has proved to be to those grain farmers, and even grass farmers, that have attempted it." (p. 311.)

Again: —

"As the blue-cap is among the trees at all seasons, the quantity of insects which it destroys, and the number of which it prevents the existence, must be very great; and therefore it and its congeners, and indeed all the scandent birds that feed upon insects, are to be regarded as nature's guardians of the orchard and the forest; and when we take that in conjunction with the handsome appearance and lively manners of this little bird, we find such a union of beauty and utility as makes us forget that those birds have no tuneful song." (p. 320.)

Their note, however, it may be remarked, though harsh and unmusical in itself (it has not unaptly been compared to the filing of a saw), is yet from association agreeable, being among the very earliest intimations of approaching spring. For a somewhat similar reason, the scream of the swift, which is chiefly heard in the most serene summer weather, is to our ears one of the most joyous and delightful sounds in nature.

"Sounds inharmonious in themselves and harsh,
Yet heard in scenes where peace for ever reigns,
And only there, please highly for their sake."

Cowper.

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any portion of the earth's surface, ought to learn something of natural history; for otherwise he runs the risk of persecuting and destroying his best friends.

At p. 321. our author, rather too indiscriminately, we think, denies "the swallow tribe" the merit of possessing song. They have, he says, "merely a sound or noise, and some of them a screech." Ought not the swallow (*H*irúndo rústica), among our British species, to have been made an exception? We agree with Mr. Main (Vol. IV. p. 413.) in the propriety of giving to this species a place among the song birds; though we admit, with him, that it may rank "rather low on the scale as a vocalist." Of all the feathered musicians the swallow is one of the earliest risers, commencing its song even before it is well light, while night is yet

"At odds with morning, which is which."

Not unfrequently have we been roused at or before daybreak, and kept awake, by the continuous song of this harbinger of summer, as it sat twittering on our chimney top, or perched on some projecting ledge adjacent to our bed-room window.

We must trespass on our limits, for the sake of making another extract, which, for its accuracy, and the important bearing the subject has on natural history, ought not to be omitted: —

> "When man alters the soil and the vegetation, the animals alter along with it. In consequence of the improvement in agriculture and of planting, many of the birds that are probably with accuracy described as having been confined to the southern parts of England, are now met with in the north, and also in the cultivated parts of Scotland. The plover comes in place of the grouse; the partridge in place of the plover; and where coppices become abundant, the pheasant, in turn, invades the dominion of the partridge. The trees and plants, with more succulent leaves, that cultivation introduces instead of the heath, the hard grass, the furze, the broom, and all those native vegetables of the north that have austere juices, necessarily bring along with them a vast number of insects. We say 'necessarily;' for wherever the proper food for any of the productions of nature is to be found, thither will that production come to it, by means that no one can find out: as, for instance, if roses or cherries are introduced, there are sure to be aphides; if any of the brassicas, there are sure to be caterpillars; and, if there be even an introduction of nettles, their beautiful butterflies will visit them. When they have increased to a certain amount, they are sure to bring not only those resident birds that feed themselves and their young upon larvæ, but also the warblers and other summer visitants." (p. 332, 333.)

These remarks we can verify by similar instances, which have come within our own experience. Having made some oak plantations, though only on a small scale, near our residence, we have occasionally found therein Thècl*a* quércus (purple hairstreak butterfly) and Melitæ'*a* Euphrósyn*e* (pearl-bordered fritillary), insects which previously we had never seen within some miles of the spot. We have seldom planted the Athenian [?] poplar without finding it taken possession of by Smerínthus pópuli (poplar hawk moth), and Cerùra vínula (puss moth), and sometimes by other less common *Phalæ*'nidæ. The copious growth of broom in our plantations induced for several seasons the appearance of *Phalæ*'na spartiàta (broom moth, Chèsias spartiàta *Stephens*); a species which we had not observed before, and which has disappeared again since the removal of the broom on which the larva feeds. The caterpillar of Acherόntia A'tropos (death's head sphinx), it is well known, feeds on the potato; the very extensive cultivation of which valuable root in the present day will at once account for the far more frequent occurrence of this fine insect of late years than formerly.* The same law, or something analogous to it, holds good also in the vegetable as well as animal world. Plants sometimes spring up, as it were, spontaneously, or, at least, nobody knows how, as soon as the soil and situation are rendered suitable to their growth. The spontaneous appearance of *E*pipáctis latifόlia in a new-made plantation has already been recorded by one of our correspondents in this Magazine (Vol. II. p. 70.), and we have ourselves observed a similar instance in the case of *O*robánche màjor, on our premises, in a spot where gorse (*U*'lex europæ'a) and broom had been introduced and encouraged.

To advert once more to a subject of ornithology, we must ask, whether our naturalist is not manifestly in error, when he states (p. 373.) that "the crake (Rállus *C*rĕx) has a strong muscular gizzard†, like poultry and the other birds that live upon seeds?" It is never without hesitation that we dare venture an opinion, on a question of ornithology, at variance with that of the *British Naturalist:* sometimes, however, *bonus dormitat Homerus;* and sure we are that the bird in question is one of those which are sometimes vulgarly, though not unaptly, termed by cooks "gut-birds;" i. e. such as are, and ought to be, dressed woodcock-fashion, without being drawn, and with the trail in them. We have often partaken of this most delicate dish at table; and on such occasions have, upon examination, never met with "a strong muscular gizzard like poultry;" but, instead, a small bag or stomach, like that of the snipe and woodcock, and have found therein little save the remains of insects; the broken elytra of Coleóptera, for instance; and never, unless we greatly mistake, any thing like the remains of corn: and for this reason, though it becomes us not absolutely to deny, we yet very much doubt, the fact of the crake ever feeding upon grain. "They are, in general, gone," says our author, "before they can do any injury to the crops." How "gone?" The corncrake is continually met with by the sportsman in the earlier season of partridge-shooting; and once we remember to have seen one drop to our own gun in the beginning of November.

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* We are informed by an able practical entomologist, that some of the fir-feeding Lepidόptera (*S*phínx pinástri? and Geόmetra piniària), which formerly occurred in scarcely any other part of this island save Scotland or the north of England, have of late years, since the growth of firs has been more extensively encouraged, been taken, one or both of them, in great abundance in the more southern parts. See Haworth's *Lep. Brit.*, p. 278, 279.

† A strong muscular gizzard is also attributed (erroneously, as we think) to the water rail (Rállus aquáticus), which, we may add, is likewise a "gut-bird." (vol. i. p. 362.)

The wood-cuts which illustrate these volumes, though by no means of the first quality, call, nevertheless, for a few remarks. Some of them, and some of the best too, are evidently copied from Bewick. We do not like them the less on that account: but the spirit of the originals has sadly evaporated in the copies. What we have most to complain of is, that the subjects have not been very judiciously chosen: there are the heron, the kite, the raven, the magpie, the jay, and the jackdaw, with many others, equally familiar to all. It would have been better to have illustrated by figures the less known, rather than the commonest species. If, for example, instead of a portrait of the lark, a bird perfectly well known to every body, the author had presented us with a good delineation of the several kinds of pipits (of which, we are told, there are, at least, three species found in Britain, and these, as it seems, not always clearly understood, but involved in some confusion), we should have felt ourselves under far greater obligations to him. Or, again, we would most willingly have dispensed with all the cuts in the work, to have had in their place accurate figures of those charming, but perplexing tribes, the whitethroats, pettychaps, and willow wrens. The figure of *Sphínx* (Acherόntia) A′*tropos* we could have wished had been either a little larger or a little less, and we do not much care which. In the one case it would have been quite palpable that the insect was represented on a diminished scale; in the other, of its natural size. As it is, it scarcely looks like either one thing or the other, and may mislead the less informed. Of the ornithological frontispiece in the second volume we can say nothing in praise. The birds there represented are stiff and formal in the last degree; and the cuts, having been made, we suspect, from stuffed specimens, are totally devoid of life and character. We should hardly have recognised the several species, had not their names been underwritten. Then there is in the titlep
opposite a most rural vignette (the artist ruined a useful

of boxwood when he cut it), which, together with certain others of like manufacture, we do hope the author will omit in the next edition, and give us, by way of make-weight, in the room of them, that most necessary adjunct to every thing in the shape of a book, an index; the absence of which we have sorely felt. Our readers will perceive that we think but meanly of the ornamental parts of the *British Naturalist.* It is but justice to add, however, that the cut of "Rook's Retribution" is neat, tasteful, and characteristic. We cannot help suspecting that this also may be a copy, though we do not immediately recollect to have ever seen the original.

One word more of complaint, and we have done. Of our author's style no unfavourable judgment will have been formed from the examples we have given. Sometimes he indulges in tediously long-winded sentences, which put us absolutely out of breath before we can get to the end of them; and even then, perhaps, their meaning is scarcely intelligible without a second perusal. We refer, as an instance in point, to the opening paragraph of part iii. (Summer) in vol. ii. The passage itself is too long to extract, nor is it worth the trouble. Sometimes we have to encounter a sentence equally obscure, in a different way; e. g.

> "Thus, though a careful examination of those places, not with a view to ascertain how the strata of the earth were originally made (of which, as we have nothing very analogous to it going on, we can have very imperfect notions), but, as to what part in its present form may depend upon causes that we can understand, can give information, it will not give us dates." (vol. ii. p. 287.)

We do not like such expressions as "too singular for being passed over," and "rather harsh and hard for being eaten." (vol. i. p. 261. 304.) Sometimes, again, we meet with an occasional Scotticism (our author, we presume, is a Scotchman), such as "would" for "should," &c. (vol. ii. p. 225.); and, now and then, with an example of false concord: —

> "They do not attack any vegetable substance in those parts, except the *gum* upon a wild cherry, or berries, and the former *are* not very numerous, and the *bilberry*, the most abundant of the latter, *are* not quite to their taste." Again: "Their slender *bills*, slightly awl-shaped, and having the top of the upper mandible a little curved downward at the tip, *does* not adapt them for that operation." (vol. ii. p. 299. 323.)

Of incomplete sentences, or rather series of words intrenched between two full stops, which yet contain no proposition, neither affirming nor denying any thing, many instances might be pointed out; let one, however, suffice: —

> "As it does not frequent gardens at the time when the cultivated cher-

ries are in crop, unless they be in the immediate neighbourhood of a wood, in which it can shelter." (vol. ii. p. 223.)

What the writer means in the latter part of the following sentence, we are utterly at a loss even to conjecture: —

> "The sand-marten (*Hirúndo ripària*) is the species most frequently met with in such localities, as it nestles in holes of the steep banks, generally in colonies at one place, *whichsoever the stream hath upwards and downwards*."* (vol. ii. p. 381.)

Errors and imperfections, like those above noticed, occur, we are sorry to observe, far more frequently in the latter part of the second volume, which, indeed, exhibits indisputable proofs of hasty composition, and most unpardonable negligence. On the whole, though we cannot entirely acquit the author of the sin of book-making, we are ready to acknowledge that he has contrived to make a very pleasant and a very useful book. With the omissions, alterations, and corrections at which we have hinted, with a view to a future edition, we venture to recommend the work to the favourable notice of our readers; many of whom, we doubt not, will derive as much pleasure and information from its perusal as, we are bound to say, we have done ourselves.

A. R. Y.

Art. II. *Transactions of the Natural History Society of Northumberland, Durham, and Newcastle upon Tyne.* Vol. I., and Part I. of Vol. II. 4to. Newcastle, 1831.

The Society whose *Transactions* are before us was established little more than two years ago, and it has already published one large volume, and a considerable portion of a second. The fact affords the best possible evidence of the zeal of its members; and the contents are very tolerable specimens of their talent and aptitude for observation. The work is handsomely printed in quarto; which, we think, is to be regretted, for *Transactions* of provincial societies can never be too cheap. Their principal use and object is to diffuse an accurate knowledge of a particular district among the bulk of its inhabitants, and to instil and cherish a taste for natural science among them; and it seems very obvious that this end can be accomplished only very partially, unless the papers are printed in a form which may admit of their being sold at a price that will at least not necessarily narrow their circulation. We are anxious to press this upon the attention of directors of provincial societies in general; for while we entertain high notions of the utility of such institutions, we are also fully convinced that their usefulness in one respect is marred and nullified by the prevalent practice of making their publications a sealed book to all, save to their own members, or to the rich, few of whom care for these things. How much the Linnean Society has erred in this respect is notorious, and is a matter of lamentation to many who know how much of valuable matter is locked up in their *Transactions;* and we regret that the Newcastle Society follows such a bad example.

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* The following also is very obscure, and cost us some trouble to understand, if, indeed, we even now comprehend the author's meaning: — "The eggs of birds, when properly described, are very useful for distinguishing the species, 'as in the same one they often differ less in colour than the birds.'" (vol. ii. p. 367.) We wish it to be understood that we have been the more particular in pointing out individual errors and imperfections, in the hope that they may be corrected in a second edition of the book, which, if we do not mistake, will, in due time, be called for.

Of the papers in zoology, we would particularise Mr. Wingate's notice of Cýgnus Bewíck*ii*, a new species of swan, which he was the first to distinguish from the common wild swan; we say the first, because some have attempted to rob him of this merit, and, in spite of fact and dates, to assign it to Mr. Yarrell. Mr. Selby has well illustrated this Cýgnus in the same volume, which contains also, from the pen of this celebrated ornithologist, a notice of Cýpselus alpìnus, and *M*érgus cucullàtus as natives or visiters of Britain; and a complete catalogue of the birds hitherto met with in the counties of Northumberland and Durham. Mr. Alder's paper on the land and freshwater testaceous Mollúsca found in the vicinity of Newcastle is excellent, and includes the descriptions of two or three new species. A notice of Fálco *a*pívorus, by the Hon. H. T. Liddell; of *B*alæ̀na *B*òops, by Dr. Johnston; and some remarks on the curious mechanical feats of a small spider, by the Rev. Mr. Turner, complete the list of zoological papers.

In botany Mr. Winch is the only contributor. In the first volume, this well-known botanist gives some interesting remarks on the distribution of the indigenous plants of Northumberland and Durham, as connected with the geological structure of those counties; and a Flora, as a catalogue perhaps the most perfect which has been yet published in this country, of the same district, occupies what has been published of the second volume.

The papers illustrative of the geology of the counties of Northumberland and Durham are numerous, and it may be useful to some of our readers to have a list of them:—1. Notice of a Whin Dyke in the Fenham Division of Benwell

Colliery, by Mr. Buddle, who gives likewise an account of the explosion which took place in Jarrow Colliery, on the 3d of August, 1830; and a Synopsis of the several Seams of Coal in the Newcastle District. 2. Notice on the effects of a Basaltic Dyke, at Butterknowle Colliery, by Mr. Michael Forster. 3. Notice of a Bed of Whin, at Stanhope, in Weardale, by W. C. Trevelyan, Esq. 4. Notes on the New Red Sandstone of Durham, below the Magnesian Limestone, by Mr. Hutton. 5. Observations on the Geology of Ratcheugh Creg, near Alnwick, by Mr. Francis Forster; and, by the same individual, Observations on the South Welsh Coal Basin. 6. On the discovery of Hazel Nuts, in working a lead ore vein in the manor of Alston Moor, by Mr. Pattinson. 7. Remarks on the Geology of the Banks of the Tweed, by Mr. Winch. 8. Description of a group of Dykes, termed Ryders, discovered in the Whitehaven Colliery, by Mr. Peile. 9. Notice of the Edge Seams of Mid-Lothian, with a description of Gilmerton Colliery, by Mr. Dunn; and an extract relative to the explosion at Harraton Colliery, in the year 1808, by the same. 10. On the Red Sandstones of Berwickshire, by H. Witham, Esq., who communicates also a description of a Fossil Tree discovered in the quarry of Craigleith, near Edinburgh. 11. Account of some Fossil Stems of Trees found penetrating through the strata above the High Main Coal, at Killingworth Colliery, at a depth of forty-eight fathoms, by Mr. Wood; who has another paper on the geology of a part of Northumberland and Cumberland.

There is another paper, a Sketch of the Life and Works of the late Thomas Bewick, by Mr. G. C. Atkinson, which we have read with pleasure and interest; and no one, we presume, will question the propriety of its insertion in a volume proceeding from the Natural History Society of Newcastle. N.

Art. III. *Catalogue of Works on Natural History, lately published, with some Notice of those considered the most interesting to British Naturalists.*

Britain.

Anon. [Understood to be by *Professor Rennie*]: Insect Miscellanies. 12mo. London, Charles Knight, 1831. Forming another Volume of the *Library of Entertaining Knowledge*, and completing the subject of Insects.

A most interesting volume, rich in amusing and instructive information, and adorned with very numerous wood-cuts. The compiler has been very prompt in availing himself of all that has been published up to the hour of putting his book to press; even the essence of our correspondent Mr. Parson's communication on the Visual Organs of Insects (*Mag. Nat. Hist.*, vol. iv. p. 124. 220. 363.) is not omitted. — *J. D.*

Sir, At p. 49. of *Insect Miscellanies*, Mr. Rennie has expressed great doubt of the truth of Mr. Huber's declaration, that the humble bee, not being able easily to obtain access to the honey reservoir of many flowers, "drills an aperture at the base of the tube, through which it insinuates its sucker." To obviate Mr. Rennie's scepticism, I beg to say, I have myself seen both the humble and the hive bee gnaw a hole at the base of the flower of the greater snapdragon (*A*ntirrhìnum màjus), and the common white jasmine (*J*asmìnum officinàle), for the purpose of obtaining the honey, and after repeated observation I have never been able to see them enter the flowers of the greater snapdragon at the mouth, as expressed by the figure in p. 49. [For other corollas perforated by bees, see p. 86.] I am, Sir, &c. — *Charles C. Babington, B.A. F.L.S. St. John's College, Cambridge, Oct.* 18. 1831.

Don, George, F.L.S.: A general System of Gardening and Botany; containing a complete Enumeration of all Plants hitherto known; with their Generic and Specific Characters, Places of Growth, Time of Flowering, Mode of Culture, and their Uses in Medicine and Domestic Economy. Preceded by Introductions to the Linnæan and Natural Systems, and a Glossary of the Terms used. Founded upon Miller's *Gardener's Dictionary*, and arranged according to the Natural System. In 4 vols. Vol. I. 4to. London, 1831. *3l. 12s.*

Deserves notice in this Magazine as a work on botany, which it is more properly than a work on gardening. Its object is to describe in the order of the natural system all the plants at present known in the world; to notice whatever properties useful to the purposes of life any species or genus may possess; and to supply directions under every family for its successful culture and propagation.

The appearance of this book forms an epoch in the progress of botanical knowledge in Britain; for it cannot fail most sensibly to impel and promote that knowledge among us; and would have produced this effect still more extensively could it have been sold cheaper. The work is one which has been long wanted in Britain. So many plants, and specimens of plants, have been gathered together from all parts of the world about us, that at every turn we are reminded of our ignorance, and have our wishes excited to know something about these lovely beings. To gratify these wishes has been, however, to a great extent impracticable, save to those rich enough to buy, and learned enough to read, the hundreds of detached and departmental volumes, in which these plants were respectively treated of. The expense of very many of these books, and the difficulty of reading them, are both dispensed with by a comprehensive work like the present, and this work written in English. To the botanist who is already rich in books and botanical knowledge it will be very valuable; for the introduction informs us, that, "when finished, it will be found to be the most complete system of plants yet published; comprehending, besides all the genera and species which have been published up to the present time, descriptions of numerous plants never before published, and derived chiefly from the *Lambertian Herbarium*. The characters of all the genera and species are derived either from the plants themselves, or from the original authorities where authentic specimens could not be procured." To those already initiated in systematic botany, but who only understand the English language, the work will be inestimably valuable; and for those who wish now to take up the study, brief introductions to the Linnæan and natural systems, and a copious glossary, are given: it is, however, not the most eligible of works for real novices in botany. — *J. D.*

Johnston, George, M.D. &c.: A Flora of Berwick upon Tweed. 8vo, 340 pages with plates. Volume the Second, containing the Cryptogamous Plants. Edinburgh, Carfrae and Son; London, Longman and Co. 1831. 7*s.* 6*d.*

In Vol. II. p. 234. the first volume of this work is reviewed, and we purpose to submit this second volume to the same reviewer. In the interim, we hesitate not to pronounce it an able production, characterised by a high and admirable degree of originality, and presenting facts and views of much interest to universal botany. — *J. D.*

Hack, Maria: Geological Sketches, and Glimpses of the Ancient Earth. 12mo, 400 pages and several plates. London, Harvey and Darton, 1832. Bound in cloth, 9*s.*

An amusing and instructive volume, and an eligible present to youth. Its scope and calibre will best appear in the authoress's own words: — " A traveller passing through a picturesque country may add to his enjoyment by delineating the cottage, the rock, or the tree, which happens to please his fancy, without venturing to portray an entire landscape; and thus, while reading the works of eminent geological writers, amused by ingenious theories, and interested by their application to well authenticated facts, I have sought to perpetuate my own pleasure, and also to contribute something towards the entertainment of others, by attempting a series of sketches, which, without pretending to the completeness of a system, may afford some glimpses of the structure of the earth. . . . This little volume is not designed exclusively for young persons, but for all to whom the subject is new, and who have not inclination or opportunity for studying it scientifically. The references will show that the works of those who are considered the best authorities have furnished the materials. As to the mode of arranging them, the adoption of colloquial intercourse seems to afford the greatest freedom and variety of illustration."

NORTH AMERICA.

Transactions of the Literary and Historical Society of Quebec, founded Jan. 6. 1824. Vol. I. 8vo, pp. 333. Quebec, 1829.

This institution owes its origin to the Earl of Dalhousie, late governor-general of Canada; and although its title does not seem to have been very happily chosen, since only one of the papers communicated to the Society is on a literary or historical subject, it has called forth the contributions of another class, the readers and students of the great book of nature, which is opened in this country at one of its most curious and ample pages. These *Transactions* are almost entirely on geological and botanical subjects, with a good paper " On the recent Shells which characterise Quebec and its environs." We owe to our Canadian friends a debt of gratitude for their zeal in the cause of science, and have no doubt that their labours will be duly appreciated and acknowledged by those in the parent country who are pursuing kindred subjects. We regret that our limits do not permit us to analyse the several papers, and that we are prevented from giving extracts from the curious one, entitled, " A Journey across the Continent, by an Indian Chief." The volume, however, is to be found in most of our scientific libraries, to which it has been transmitted by the liberality of the Quebec Society. — ☞

A Monthly Journal of Geology and Natural Science was commenced at Philadelphia, in July last, conducted by G. W. Featherstonehaugh, Esq. F.G.S. &c.

Most heartily do we wish prosperity to this transatlantic cont

Harris, ***Thaddeus Mason***, **D.D.: Natural History of the Bible.**

I beg leave to call the attention of your readers to this interesting work, by the learned Thaddeus Mason Harris, D.D., of Dorchester, near Boston, Massachusetts. Boston, 1820. The first edition was published in the year 1793. The second is in 8vo, pp. 479. I am sure that it will give great satisfaction to every one who studies it. The biblical student, especially, will be delighted with it. Few works exhibit greater proofs of learning and research. — *J. M. Philadelphia, August*, 1830.

Rafinesque, C. S., A.M. &c.: Précis des Découvertes Somiologiques, ou Zoologiques et Botaniques. Palerme, aux dépens de l'Auteur, 1814.

The name of Rafinesque is by no means unfamiliar to naturalists; and this little book testifies that it ought not to be. It makes known 190 species of animals and plants that this author had, as early as 1814, discovered and described. These species, the names he has applied to them, and short characteristic descriptions of them, are the contents of this book. — *J. D.*

Anon.: Popular Lectures on the vertebrated Animals of the British Islands, with an Appendix, containing a Sketch of Extinct Animals. 8vo, 96 pages. Birmingham, Wrightson, 1831.

Contains much delightful matter, and will be farther noticed hereafter.

Rafinesque, C. S., A.M. &c., Professor of Botany, Natural History, &c., Philadelphia: Principes Fondamentaux de Somiologie; ou, les Loix de la Nomenclature et de la Classification des Corps organisés. 8vo. Palerme, aux dépens de l'Auteur, 1814.

This work, although printed in Italy, was received from Philadelphia, where Professor Rafinesque now resides. The "Laws" are necessarily familiar to all professed naturalists; but we have never before met with so welcome a synoptical digest of them, and we may some day present a selection of them for the information of our juvenile readers. Somiology is designed to express the science of organised bodies in one word, and seems derived from *sōma*, a body, and *logos*, a discourse; and, without it, two must be used, as Zoology and Phytology or Botany. Professor Rafinesque's "Laws," or rules, are 186 in number; and to these are subjoined his divisions and subdivisions of Somiology, with a definition of each. — *J. D.*

Rafinesque, C. S., A.M. &c.: Medical Flora, or Manual of the Medical Botany of the United States of North America. 2 vols. 8vo, with 100 wood-cuts. Atkinson and Alexander, Philadelphia, 1828.

These two volumes include above 500 closely printed pages, from which we may eventually select some extracts useful to our readers. It contains considerable contributions to critical and technical botany, and which should by no means escape appropriation by botanic systematologists. The wood-cuts are not equal to those of Britain, nor are they improved by being printed in green. — *J. D.*

Art. III. *Literary Notice.*

Mr. Samouelle's new work, *The Entomological Cabinet*, is in the press, and the first number will soon make its appearance.

COLLECTANEA.

Art. I. *Zoology.*

Hares taking the Water. — Sir, Some of your correspondents seem to doubt if hares ever take the water *voluntarily.* I can affirm that I have frequently seen them do so when I have been fishing. Two years ago, whilst standing on the banks of the Ure, in Wensleydale, I remember seeing a hare come to just opposite me, and sit for five minutes, looking across the river: at length he quietly sprang into the water, and swam towards me. I remained motionless, and he came out not five yards from me, and cantered off to the other end of a large field, where he joined another hare (I suspect a female). They there gamboled together for above half an hour. He then returned, took the water again about fifty yards from me, and landed on the other side. On this occasion, I am convinced the all-powerful passion of love was the motive which induced the hare to take the water; and, as on other occasions I could never discover any symptoms of fear, I conclude that has generally been the occasion of their doing so. The hares I have seen swim high out of the water, and boldly, as if accustomed to it. Yours, &c. — *Thomas Thompson. Hull, Aug.* 4. 1831.

Some Account of the Stoat. — The stoat (*M*ustèla ermínea) has much the same habits as the weasel; and, though more timid, is equally mischievous among poultry and their eggs. It is more abundant than the weasel, probably in consequence of its not being able to enter the holes of the reptiles by which it is killed. The stoat does not change its colour here, as in the northern parts of the world, by which its fur becomes so valuable an article of commerce, though it has been observed that its breast and throat are whiter in winter than in the summer months. — *J. M. Jan.* 23. 1831.

As a balancing good to the evil of the stoat's destroying poultry, &c., it appears also to destroy the water rat. See Vol. III. p. 145. — *J. D.*

Some Account of the Weasel. — *Jan.* 23. The foot-marks of the weasel (*M*ustèla vulgàris) are now visible on the snow by hedge sides. It lives in holes (usually made at first by the mole) under the roots of trees and hedges, and preys on mice, small birds, &c., and consequently destroys or drives from the neighbourhood of its residence all of these tribes within its reach: of course it must prowl about by night for supplies. It is a bold audacious little animal, and often commits depredations on the chicklings of the poultry-yard. This makes the farmer its enemy, though it is sometimes his friend, when it happens to choose a corn-rick for its domicile, as it drives thence all other vermin. For the sake of the poultry, however, its haunts should be known, and there is no readier way than tracing it home in the snow. At daylight on mornings weasels may be seen hurrying home with a mouse or bird in their mouth; and if intercepted, will retire into a hedge, lay down their load, return and peep out, till they think they can proceed in safety. Their young often fall a prey to the viper (*C*óluber *B*èrus), when they meet in their holes. Cats kill the weasel, b seldom eat them, unless pressed by hunger. In the north this animal is called the foumart, and sometimes whitret, as if white rat. — *J. M.*

The weasel's tenacious reluctance to relinquish its young and its prey is noticed by *Scólopax rustícola* in his article "On the Habits of the Weasel," Vol. IV. p. 337.; and some highly interesting particulars on the habits of this animal are given by W. L., Vol. III. p. 234. — *J. D.*

The Mole shows Changes of Weather, &c. — *Jan.* 20. Mole (*Tàlpa* europæ`a) works. It is remarkable that this animal sometimes gives notice of a change of weather. The temperature or dryness of the air governs its motions as to the depth at which it lives or works. This is partly from its inability to bear cold or thirst, but chiefly from the necessity it is under of following its natural food, the earthworm (*Lumbrícus* terréstris), which always descends as the cold or drought increases. In frosty weather, both worms and moles are deeper in the ground than at other times, and both seem to be sensible of an approaching change to warmer weather before there are any perceptible signs of it in the atmosphere. When it is observed, therefore, that moles are casting hills through openings in the frozen turf, or through a thin covering of snow, a change to open weather may be shortly expected.

The cause of this appears to be as follows: — The natural heat of the earth being for a time pent in by the frozen surface, accumulates below it; first incites to action the animals, thaws the frozen surface, and at length escapes into the air, which it warms and softens; and if not counterbalanced by a greater degree of cold in the atmosphere, brings about a change. Changes from frosty to mild weather, caused by the ascent of heat from the earth, are often so evident, that the circumstance needs no confirmation. Stronger proof, if proof were necessary, cannot be given than the common appearance of frost or snow remaining longer upon ground having a stratum of rock beneath, than upon that where there is none. Old foundations of buildings, which have not been dug out, are easily traced by the same appearance; and any subterraneous solid body, as large stones, drains, planks, or pieces of timber, may be discovered in the same way; and even a plank laid across a ditch at such times will remain covered with snow for many hours after the snow on the ground is all melted and gone.

This sufficiently accounts for the activity of the mole before a change of weather, and deserves to be noted by the meteorologist among his other prognostics of the weather.

The mole, though generally a despised and persecuted animal, is nevertheless useful in some degree to the husbandman, in being the natural drainer of his land, and destroyer of worms. To other inferior animals he is a sapper and miner, forming for them their safe retreats and well-secured dormitories. — *J. M. Jan.* 20. 1831.

Some very interesting remarks on the physiology and habits of the mole will be found in our Vol. II. p. 420, 421.

Do moles swim of choice? I have known them prevail in an allotment of land which was every where bounded by streams, except at the gateway by which access was obtained. It is far more likely that the moles swam to the allotment, than distinguished the gateway. — *J. D.*

Uses of the Mole. — Agronome remarks, Vol. IV. p. 557., "Whatever James Hogg may say in favour of moles, I am of opinion that they are noxious vermin, and ought to be extirpated the kingdom." As some of our readers may not be aware how much James Hogg has said on the subject, we present an extract: — "The most unnatural of all persecutions that ever was raised in a country is that against the mole, that innocent and blessed little pioneer who enriches our pastures annually with the first top-dressing, dug with great pains and labour from the fattest of the soil beneath. The advantages of this top-dressing are so apparent and so manifest to the eye of every unprejudiced person, that it is really amazing how our countrymen should have persisted, now nearly half a century, in the most manly and valiant endeavours to exterminate the moles from the face of the earth. If a hundred men and horses were employed on a common-sized pasture farm, say of from 1500 to 2000 acres, in raising and conveying manure for a top-dressing of that farm, they would not do it so effectually, so neatly, or so equally, as the natural number of moles on that farm would do of themselves." (*Quarterly Journal of Agriculture.*)

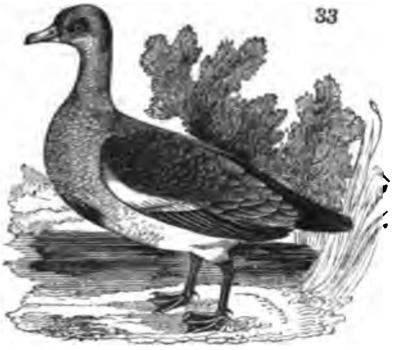
Notes on the Water Shrew. — *Jan.* 28. Water shrew (*Sòrex fòdiens*) appears. This is a curious little animal, and not often seen, except by those acquainted with its habits. It resembles the common shrew, but is twice the size; the upper part of the body black; beneath, dirty white; the fur like that of a mole. Water shrews burrow and live on the banks of rivulets and spring-water ditches, and appear to collect their food, which probably consists of the larvæ of some of the ephemeral flies, from among the loose mud. If cautiously watched, they being naturally shy, they may be seen crouching at the mouths of their holes, looking intently into the water; and should a shoal of minnows (*Cýprinus Phóxinus*) or sticklebacks (Gasterósteus aculeàtus) pass near, the shrew plunges amongst them, but seldom succeeds in making a capture; and, returning to his station, looks out for another chance. They dive with much adroitness, and can remain under water for the space of a minute. Their fur repels the water from their bodies, as while they are submerged they appear to be almost white. When pursued by the weasel, they drop into the water, and pass to the opposite side. — *J. M. Jan.* 28. 1828.

The date of this communication, which we received almost as soon as written, shows that we should have published it anteriorly to Mr. Dovaston's esteemed article on the same subject, dated May 6. 1829, published in our Vol. II. p. 219. That communication has excited contributions to the more complete history of this interesting animal at p. 399. and 483. of Vol. II., and p. 90. 188. 236. and 471. of Vol. III.; and the information contained in the present account will be found confirmatory and additional to that contained in the previous ones. W. W.'s (of Liverpool) notice, Vol. III. p. 471., of the differences in character which he observed in the captured specimens he examined, from the specimens described by Mr. Dovaston, Vol. II. p. 221., induce us to refer W. W. to Mr. Ainsworth's remarks in Vol. II. p. 483., which go to prove that there are two British species of water shrew. — *J. D.*

Notes on the Common Shrew. — *April* 2. The common shrew (*Sòrex Aràneus*) appears. The shrew is well known, especially to mowers and reapers. Their economy is much like that of the field mouse (*Mús sylváticus*). It is observable, that, if two are seen together, they are almost always quarrelling. Whether the contest be amatory or malicious is uncertain; but the sufferer's cry is the most piercingly acute of any sound with which the ear can be assailed. Cats kill, but seldom eat, the shrew.— *J. M. April* 2. 1831.

The last sentence asserts a fact exceedingly familiar to the inhabitants of the fens of Cambridgeshire, but where the name of shrew is scarcely known. Its name there is mog-mouse; almost without question, a corruption of bog mouse. W. L. (Vol. III. p. 236.) says, " the cat kills, but does not eat, the common shrew." — *J. D.*

A rare Variety of the Goose Family. — Sir, The severity of the season [winter of 1829–30] having brought with it the usual accompaniment of numerous flocks of wild fowl, it has happened, as is generally the case, that some rare specimens of the *A*'nas tribe have found their way from far distant lands, to seek protection for a while on our shores. Amongst others, a beautiful variety of the goose family has been shot in the neighbourhood of Frampton on Severn. Not having any work of reference where I am now writing, I cannot exactly say whether I am correct in its name (the Cape goose). Enclosed is a small, but tolerably accurate, sketch (*fig.* 33.), roughly made by me, since the bird has been set up. This, with the description, will enable your readers to form a tolerable notion of this very handsome bird. The head is ash colour, mixed with chestnut; the patch surrounding the eye bright chestnut: the neck ash colour, inclining to chestnut; bill small, rather high in the middle; the nostrils and the edges of the bill black. Round the lower part of the neck is a bright chestnut ring; breast ferruginous, speckled with black, and on the lower part of the breast is a large patch of bright chestnut. Scapulars ash colour, on a light chestnut ground, pencilled with black. Primaries glossy black. Bastard wing white, divided by a line of glossy green feathers, the rest of the wing dark chestnut, slightly pencilled with black. Belly dusky, and speckled vent, ferruginous rump, and tail black. Legs and feet red, toes black. Length from top of the beak to the end of the tail 2 ft. 4 in. From the bird's being set up, as drawn, I had no opportunity of measuring the breadth. It was pursued for many days before it was shot. Yours, &c. — *Walter Henry Hill. January* 13. 1830.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The Kentish Plover not a variety of the Ring Plover, or Dulwilly, as it is asserted to be in Rennie's Montagu's Ornithological Dictionary. — Sir, Having taken up the second edition of *Montagu's Ornithological Dictionary*, edited by James Rennie, A.M. A.L.S. &c., in hope of finding some account of the Kentish plover, I found it stated to be a "variety of the king-plover," or dulwilly [*Charàdrius* hiatícula *Linn.*]. Now, as, in the same work, it is justly affirmed, "that it is by observation alone that science can be enriched, while a single fact is frequently sufficient to demolish a system;" and as I only wish to accomplish the first part of this quotation; I do not conceive I shall incur the charge of presumption if, in opposition to Montagu's opinion, strengthened as it is by that of Mr. Rennie, I lay before you my reasons for thinking the Kentish plover to be a distinct species: hoping that, through your Magazine, either my error, or that of the ornithologists who doubt the Kentish plover's being a species, may be corrected. In May, 1830, I first met with these birds, in Pegwell Bay, and on the Sandwich Plats, in Kent. They were then in pairs, and probably bred in the banks of shells which abound there. On examining a bird shot on the 25th of May, I found it to be a male, according exactly with Latham's description of the bird given in Bewick, except in size; the following being the measurement: — Length from the point of the bill to the tip of the tail, 6½ in.; breadth, 13½ in. Latham says it is of the same size as the ring plover; now the latter bird measures nearly 7½ in. in length, and 17 in. in breadth; making a difference between the two of nearly an inch in length, and 3½ in. in breadth. The bill of the Kentish plover is more slender than that of the ring plover, and measures five eighths of an inch. The female differs from the male, in having no black or rufous colour in her plumage; her markings are otherwise the same as in the male bird. Although I cannot say that the Kentish plovers did not mix in the flocks of ring plovers and dunlins in feeding; yet I never saw them join them in the air. Indeed they seldom took wing; but, on being approached, generally ran, uttering a shrill cry, towards the nearest bank of shingle or shell, where, being always difficult to be seen, they sometimes rendered themselves still more so by crouching down. I obtained in all seven specimens, three males, and four females; amongst which there was no material difference. I conceive these birds have hitherto, by some ornithologists, been confounded with those varieties of the ring plover which are occasionally met with wanting the gorget, &c.; but they appear to me to be perfectly distinct; the birds I met with being altogether of a lighter form. I remember observing this difference particularly on seeing a Kentish plover and a ring plover placed in the same case, as a pair of the latter species, in the shop of a noted preserver of specimens of natural history, in London. Hoping that this may lead to some further elucidation, I am, Sir, yours, &c. — *George Clayton. Rochester, September* 19. 1831.

Identity of the Green Sandpiper and the Wood Sandpiper. — Sir, The question whether the green and wood sandpipers are the same species seems, from Mr. Rennie's edition of *Montagu's Ornithological Dictionary*, to be undecided; but, as a specimen has just come under my notice which appears to me to clear up this difficulty, I shall offer no apology for sending you a description of it. The length from the bill to the tail is 10 in.; to the end of the toes, 11¾ in.; breadth, 17 in.; length from the knee to the toe, 2¾ in.; thigh joint to the toe, 5¼ in. The bill measures 1¼ in. from the corner of the mouth, and is very slender; the upper mandible, which is black, and slightly curved at the point, is a little longer than the lower one, which is a dark green at the base, and black at the point; a dark streak extends from the base of the upper mandible to the corner of the eye, and above it is a patch of dirty white, intermixed with minute dusky spots; a small circle of dirty white surrounds the eyes: the chin is white; the cheeks, throat, and forepart of the neck white, spotted with dusky, with which colour a few laminæ at the end of each feather are marked their whole length; the breast has a dappled stripe, of the same colour as the throat running down the middle of it; with this exception, it is white, as are also the belly, vent, and under tail coverts.

The crown of the head and hinder part of the neck are a dingy brown, which, on the neck, has a shade of ash colour; the bend of the wing and lesser wing coverts are brownish black; the whole upper part of the plumage is of a glossy brownish green, which is spotted on the middle wing coverts with minute white spots, that change to a dingy yellow on the back, scapulars, and tertials, the last of which have twelve spots on the outer margin of the feathers, and six on the inner one; the tertials are very long, the longest of them reaching to within a quarter of an inch of the extreme top of the wing, which reaches to the end of the tail; the quill feathers are wholly black, as are also the secondaries; the upper part of the rump is black, and each feather slightly tipped with white, which forms small wavy lines on that part of the plumage; the lower part of the rump and upper tail coverts are pure white; the tail, which is even at the end, consists of twelve feathers, which are barred with black and white alternately. At the end of Bewick's description of the green sandpiper there is a very exact representation of a cover feather of the tail, and an inner wing covert, which will give a better idea of their appearance than a page of letterpress. The legs are dark green, the outer toe connected with the middle one by a membrane as far as the first joint; toes very slender, middle one 1¼ in. long. Weight 2¾ oz. Killed on the 17th of September, 1831, near Stoneyhurst.

I have been thus minute in my description, from a wish to clear up the doubt that appears to exist as to the identity of these two birds; the one I have now before me is undoubtedly the green sandpiper of Bewick, but it corresponds, in so many particulars, with the wood sandpiper of Montagu, and appears to combine so many of the peculiarities of each, without exactly agreeing with either, that I think it proves satisfactorily their identity. The glossy green of the upper plumage, the barring of the under wing coverts, and the tail, identify this bird with the green sandpiper, whilst, on the other side, the yellowish spots on the scapulars and tertials, the black rump, the length of the leg, and the web between the outer and middle toes, are characteristic of the wood sandpiper of Montagu. I leave your readers to decide whether this description (which is as accurately given as I am able with the bird before me) is sufficient to identify the two species. — *T. G. Clitheroe, September* 23. 1831.

The Middle-spotted Woodpecker of Bewick. — Among the few rare British birds which it has been my good fortune to procure, is a woodpecker which is not described in *Montagu's Dictionary*, although it is mentioned by Bewick as a dubious species under the name of the middle-spotted woodpecker. I sent Mr. Rennie an account of this bird some time ago, but as I know not whether he ever received my letter, I shall now repeat the description: — A pair of these birds had built their nest, or rather hatched their young (for there was no nest), in a hole in a decayed ash, about 20 ft. from the ground: there were two young ones, which I secured, as well as one of the old ones, and they are all now in the possession of a friend of mine, who is a collector of specimens of ornithology. The old one measured 9½ in. long, and weighed 46½ dwts. an hour after it was killed; the forehead is a dirty buff, and the whole crown of the head a bright crimson; in other respects it corresponds with the description of the whitwall (*Pìcus* màjor) in Montagu and Bewick; the young ones have also the bright crimson head, and do not differ very materially from the old ones.— *T. G. Clitheroe, September* 23. 1831.

Notes on the Scoter (A'*nas nìgra* Lin., *Oidèmia nìgra* Flem.). — I killed one of this species on the Ribble, on September 16. 1831, and I mention it, on account of the contradiction it gives to some particulars of the description of this bird in Rennie's *Montagu's Dictionary*. There it is stated that " this bird is only seen with us in the winter season, and is never observed to visit our rivers or freshwater lakes." The 16th of September, in this year, 1831, could hardly be called winter, and the place where I killed it is forty miles from the sea. — *T. G. Clitheroe, September* 23. 1831.

Notes on the Turtle Dove. — *May* 6. Turtle dove (*C*olúmba *T*úrtur) arrived. The poetical character of this innocent and beautiful emigrant excites an interest in its favour even in the breast of the keenest sportsman. They visit us in pairs, and take up their abode in some thick wood. Their unsuspicious temper makes them not over careful in concealing their nest, it being built on a sprayey part of a horizontal branch of a tree, about 8 ft. or 10 ft. from the ground. They lay two eggs, and consequently breed but one pair of young ones; and this they do but once in the season. It is probable they live many years, as the same spot is chosen for their nestling for a course of years, though it is impossible to ascertain whether it be by the same birds. They are remarkably swift on the wing, and can easily escape from their mortal enemy, the sparrow-hawk, unless taken by surprise. Their plaintive call of *tur-tur, tur-tur*, is peculiarly pleasing, resembling so much the accents and language of affection. Before they leave us for the winter, they congregate in little bands of ten or twelve together, about the end of September, and soon afterwards take their departure to the southward.

They are particularly useful in this country to the farmer, by living chiefly on the seeds of tine-tare (*E'*rvum hirsùtum), where it abounds; and, as this tare never vegetates but in wet seasons, the turtle may be observed searching for the dormant seeds in dry ones. As they are seminivorous birds, it is not likely that they go far to the southward in winter, as the stubbles in the south of Europe will always supply them with food. They are easily tamed, and easily preserved, if kept warm enough in winter. — *J. M.* *May* 6. 1831.

The same writer has additional remarks on this subject in the *British Farmer's Magazine* for August, 1831, p. 347, 348., which we here present. "*Tine-tare* is a most troublesome weed both in the field and the barn. In the first, it literally strangles the crop; in the second, it causes much additional labour in sifting, to pass its seeds, and to bring its unbroken pods to the surface to be picked off. Of this weed it is truly said, that the seeds lie dormant in the soil for years, as they only vegetate in moist warm summers. Turtle doves are particularly fond of this small pulse, frequenting the stubbles in the autumn where the tares have grown; and again in May, when these stubbles are getting into order for turnips, or are previously sowed with oats or other crop." — *J. D.*

The Pied Flycatcher, or Coldfinch (Muscícapa luctuòsa*), is said by all the books to be common nowhere; perhaps it is nowhere numerous: but from my earliest years I have seen one or two, and this year, in company with your fanciful correspondent Von Osdat, three pairs, among the old oaks, on the slope close to the western walls of that stern and august mansion, Chirk Castle, where the rocks overhang the rapid Ceiriog, exactly where Offa's Dike crosses that river. I also even see them, in their season, among the venerable and quiet shades of Vale-Crucis Abbey; and in the year 1823 I saw several in Gowbarrow Park, Cumberland, on the banks of Ullswater, as I perambulated that delicious country with my friend, that industrious and scientific naturalist, John E. Bowman, Esq. F.L.S. For a description, I refer to my lamented friend Bewick, who, in his modest diffidence of his own surprising powers, has given two spirited cuts; both of which are correct and striking attitudes the bird often assumes. Its manners somewhat resemble those of the M. *Grisola*, by snapping flies, and returning again and again to the same stand. It has two notes, soft but very audible, and not unmelodious, which it repeats alternately for eight or ten times frequently. Its song is extremely like that of the redstart, and for which, by an unornithic ear it might be readily mistaken, as it was even by my accurate friend Wood, till I pointed out a slight difference of the rough curl in the middle of the short, but often resumed, song: and, like that bird, it has a very favourite habit of just alighting a moment on the ground, or hastily and insecurely on the side of a tree, picking an insect, and instantly returning to the same perch. Early in every April, I observe a pair in my orchard, where they play and feed for a day or two, probably on their way to Wales. They are readily distinguished, particularly the male, by the very striking contrast of extreme black and white; a magpie in miniature, with a white spot, as it were the last snowdrop, very conspicuous on the forehead. I am sure they return annually to the same holes in the old oaks,

—— "whose boughs are moss'd with age,
And high tops bald with dry antiquity;"

and, I think, by the very same line, as I generally see them in or near the very same trees in my orchard on their passage: and so well do I know when and where to watch for them, that one April, going to show my amiable friend Tudor (your Bean-bee Tudor, Vol. IV. p. 94.), while adjusting the focus of my small ornithoscope upon a post, the then-arrived bird actually appeared within its field. — *John Freeman Milward Dovaston. Westfelton, near Shrewsbury, July* 20. 1831.

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* Muscícapa luctuòsa. It is seldom I like to see the good old names of Linnæus changed, who calls this bird Atricapílla: his cap, indeed, is not entirely black; and the new specific term, luctuòsa, better depicts the somewhat mournful bearing of the bird, both in plumage and motion.

Intrepidity of the Swallow. — G. M. remarks (Vol. IV. p. 146.) its attacking the stoat (*Mustèla ermínea*): I have seen it attack the common cat in the same manner. Swallows were and are allowed to build in out-houses belonging to my father; the house cat would often bask in the sun beside the out-houses, when the swallows always testified their detestation of her by flying over her head in a rapid sweeping curve, almost touching her in its lowest inclination; and they shrieked their hatred as they flew. The cat was young and playful, and annoyed them in return by catching at them as they passed: this time they would fly in front of her, next time behind her; and this alternation kept her oscillating, as it were, as her hind quarters still lay on the ground, from side to side. Now and then, as if enraged by their pertinacity and her own want of success, she would spring up into the air at them as they passed, with her best vigour and agility; but I never knew her catch one. Mr. Main describes (Vol. IV. p. 413.) the dauntless bravery of the swallow, and says, it is " one of the most vigilant videttes for the safety of the feathered race." (See Vol. IV. p. 413. for farther information.) — *J. D.*

The *Verulam*, a periodical, commenced two or three years ago, and since discontinued, gave, in one of its Numbers, the following interesting account of

A Cat which caught Swallows on the Wing. — The thing appears, *à priori*, nearly impossible, and yet we stake our credit on the authenticity of the fact, having seen the whole process of grimalkin's wonderful cunning, and almost miraculous rapidity. It was in the early part of May, when insects, in consequence of the cold, fly low, and of course the swallows are forced to hawk for their prey by skimming the surface of the ground. The wily cat, taking advantage of this, stretches herself upon a sunny grass-plot, with her legs extended, as if she were dead; the flies collect about her, as flies always do when they can find any animal as patient as my Uncle Toby, to endure their tickling and buzzing; the simple swallows, dreaming of no harm, and thinking they can here make a good meal, dip down from the barren air, dart with open bill upon the flies; when puss, perceiving her prey within reach, makes a spring like a flash of lightning, and strikes down with her paw the poor thoughtless swallow. The best marksmen know how difficult it is to shoot a swallow on the wing; but the cat found her patience, cunning, and rapidity, well rewarded by her unerring success whenever a swallow ventured within her reach. (*Verulam.*)

Tongue of the Frog (Ràna *temporària*). Sir, Having, while dissecting a frog, observed the peculiar construction of its tongue, and thinking it may be as new to some of your readers as it was to myself, I am induced to transmit to you the following remarks upon its structure and uses: — The most striking peculiarity consists in the tongue being affixed to the anterior part of the lower jaw, its greatest breadth being at the root, where it unites with the jaw, and the point lying at the back part of the mouth; it is also partly confined by a membranous frænulum [a membranous string under the tongue], of the same substance as the tongue, and capable of some expansion. The only conjecture I can offer as to the purposes this singular structure is designed to effect is, that the food of this reptile, consisting of molluscous animals, whose tenacity of life is very extraordinary, and the animal heat of the frog not being sufficient to destroy them immediately after being received into the stomach, they might endeavour to escape; and as this viscus is in the same direction as the mouth, it would favour their so doing, did not the tongue effectually prevent them, by pressing against the upper palate. According to this idea, this deviation from the general structure fulfils the design of the Great Author of the Universe, whose "mercies are over all his works." Yours, &c. — *Juvenis. Edmonton, November* 25. 1831.

Trichiosòma lucòrum, the Pupa and Imago of, a Habitat of, and the destruction of by one of the Ichneumónidæ. — Sir, I find that the author of *Insect Architecture* has passed by unnoticed the curious follicle formed by the caterpillar of the Trichiosòma lucòrum; I therefore beg to furnish you with the following facts respecting it: — My little boy, being very fond of prying into the manners and customs of insects, brought home last autumn several cones or follicles containing the pupæ of the above species. These he found on a hawthorn fence in Southwell Road, situate a few hundred yards from Brazen Doors, in the south-west side of Norwich; and they were enclosed in a paper box, and remained in my study during the past winter. To my surprise, on the 24th of April, 1831, my daughter informed me that her brother had confined two bees in his box; which, on examination, proved to be two specimens of imagos of the above-named species, that had changed from their pupa state, and escaped from their follicles. This they had effected by working a transverse groove in the inner surface of the follicle, with the strong mandibles with which they are furnished; and, getting one of these through, they cut the follicle nearly all round as if with a pair of shears, and this done made egress readily. These curious follicles or cones (see *fig.* 34.) are formed of the insect's gluten and of the contiguous leaves of the hawthorn, which grow in tufts on the young twigs: several cones in my possession have the exterior leaves entire. My curiosity induced me to open one of the cones or follicles, which proved of so tough a texture, that a penknife entered it with considerable difficulty.

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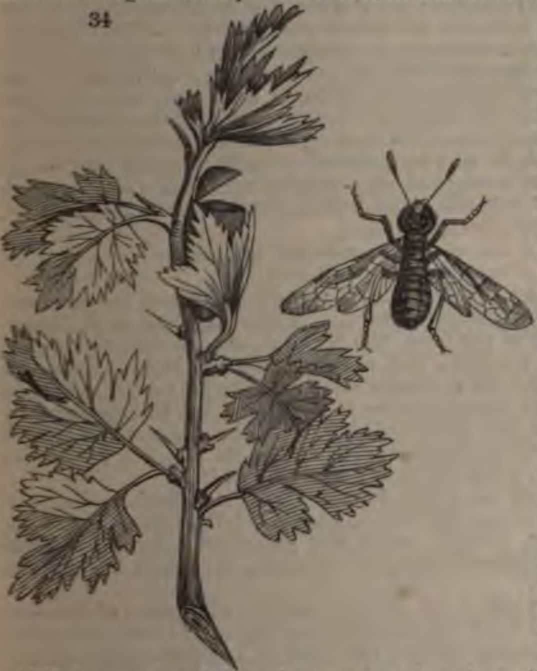

The inside of the follicle had a perfectly smooth, I may say a polished, surface; the outside had a fibrous appearance from the texture of the leafy material out of which the cone or follicle is constructed, and possibly also, in part, from the agglutinated hairs of the larva. These cones, thus constructed, must completely screen the insects from the observation of their larger enemies; but they have others to fear of a smaller kind. The *I*chneùmon [which species ?] deposits her eggs in the caterpillar or larva, which carries them with it into its pupa state; and these eggs of the *I*chneùmon, are themselves afterwards hatched into caterpillars that eat up the insect in which they had been deposited. A specimen of the Trichiosòma was found by a companion of my boy's, which was full of these Ichneùmon caterpillars; and an old empty follicle, which I found, had likewise had its occupant destroyed by the same kind of depredators. The imagos or flies of the Trichiosòma appear to be tolerably abundant in the habitat mentioned.

The accompanying figure is sketched from nature by my young naturalist (now 9½ years of age), who is entirely self-taught, and I hope it may be sufficiently to your purpose to have it engraved; as it would probably induce others to direct the attention of their children to the study of nature. I am, Sir, yours, &c. — *Samuel Woodward. Norwich, May* 16. 1831.

The above instance of the check effected by the Ichneumònidæ to superabundant increase in the insect population, should be added to the other instances enumerated p. 105. — *J. D.*

Corollas and Petals perforated by Bees. — Mr. Rennie disputes (*Insect Miscellanies*, p. 50.) the younger Huber's assertion, that bees perforate the tubes of bean flowers (Fàba vulgàris); he will find that assertion confirmed Vol. IV. p. 93. of this Magazine; and that of their perforating the nectaries of aconite blossoms averred Vol. IV. p. 479. In the present Number, p. 74., he will perceive questionless testimony that bees also perforate the blossoms of Antirrhìnum màjus, which Mr. Rennie (*Insect Miscellanies*, p. 49.) disputes; and also those of Jasmìnum officinàle. In addition to these instances, we present the following: — Dr. Withering, in noticing our native columbine (Aquilègia vulgàris), in his *Arrangement of British Plants*, observes, "The elongated and incurved nectary of this flower seems to bid defiance to the entrance of the bee, in search of the hidden treasure; but the admirable ingenuity of the sagacious insect is not to be thus defeated; for, on ascertaining the impracticability of effecting his usual admission, he with his proboscis actually perforates the blossom near the depôt of honey, and thus extracts the latent sweets without farther difficulty." (*B. Maund*, in his *Botanic Garden* for September, 1831, under Aquilègia canadénsis, No. 322.)

The following notice of petals perforated by bees, we quote from the *Lancaster Herald* of June 30. 1831: —

"*The Humble Bee.* We have had a singular instance of the destructibility of this insect, amongst carnations, communicated to us by Messrs. Connelly and Son of this town, who have had many of their best flowers destroyed by it. It appears that, as soon as the bud begins to open, the bee settles upon it; and by causing some injury to the foot of the petals, by its proboscis, all farther process is stayed, and the bud dies, scarcely half blown. This fact was mentioned to Mr. Loudon, who, when here, found Mr. Connelly, jun., engaged in destroying the bees, and washing the buds of his plants, to prevent further injury." — *J. D.*

Hydròbius lateràlis not a British Insect. — Sir, Mr. Curtis having upon my authority introduced into his valuable *Guide* * Hydròbius lateràlis *Fab.* as a British insect, I feel it due to that gentleman as well as myself, to state that its admission as such was erroneous, and that it has no claim to be so regarded.

The fact is, that one or two entomologists in a distant part of the country (whose names I will not mention, believing them to be ashamed of the transaction) managed to foist this insect on a very assiduous collector, but possessing no scientific knowledge, by dishonourably substituting it for an insect of a genus, to an unpractised eye, somewhat resembling it in external appearance. The poor man, without any suspicion, disposed of the insect as British, and of his own capturing, to the highly respectable gentleman in whose cabinet I observed it. Both this gentleman and the collector, who is a very deserving and honest man, are now satisfied they have been grossly imposed upon.

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* A Guide to an Arrangement of British Insects, by John Curtis. Reviewed in p. 429. of our Fourth Volume.

I cannot but express my unqualified detestation of all such attempts at imposition, from whatever motives they may arise; but especially in this instance, in which I have reason to believe the design of the parties was utterly unworthy of men professing the slightest regard for science I am, Sir, yours, &c.— *A. H. Davis. London, Sept.* 19. 1831.

Ravages of Cetònia hírta of Scopoli and Fabricius. — Sir, In some remarks on the Cetòniæ, in the 94th number of *British Entomology*, I alluded to a letter addressed to the Horticultural Society of London, on the subject of the ravages of a species of Cetònia, an extract from which letter was transmitted to me, with specimens of the insect, for my opinion respecting the species; and, as I regretted not being able to subjoin this account to my observations, I hope you will do me the favour to give it a place in your Magazine.

Mr. St. John says, " And a gentleman [the Cetònia hírta *Scop.* and *Fab.*] which the Maltese call Bouzuff, and the English inhabitants the Botany Bay, after he has filled himself, retires under ground till the March apricot blossoms, when he emerges; and I am for two months obliged to have people employed solely to pick him off the blossoms, of which he readily eats the nectary; and, having eaten one, he goes to the next. He is very active, and flies like a bee. When the roses are in blossom, these beasts are so fond of them, that you may take twenty out of one flower, and in ten minutes as many more. A dark-coloured flower they never touch. I don't think he is known in cold climates."

The beetle above alluded to by Mr. St. John is very similar in size and colour to the Cetònia stíctica figured in *British Entomology* (pl. 374.); but it is duller and more hairy, and appears to me to be the Cetònia hírta of Scopoli and Fabricius, which is found as far to the north as Paris. I am, Sir, yours, &c. — *John Curtis. Grove Place, Sept.* 1831.

Art. II. *Botany.*

A variety of the common Groundsel (Senècio *vulgàris*). — Sir, I have on three or four different occasions met with a variety of the common groundsel (*S*enècio vulgàris), which I do not find noticed in our English Floras. The florets, invested by the pappus, seem to be unnaturally protruded beyond the summit of the involucrum. This appearance reminds one of the female flowers of *G*naphàlium dioícum, and *T*ussilàgo *P*etasìtes. Having found a specimen of this variety three days ago near St. Albans, I send you a drawing of its inflorescence (*fig.* 35.). *a* and *b* represent two states of the capitulum, of the natural size, and *c* is a magnified floret. One striking deviation in this variety from the ordinary character of the plant, consists in the considerable exsertion of the stigma beyond the anthers and far beyond the corolla, arising from the elongation of the style; whereas the stigma is in general scarcely, if at all, protruded. Smith, in the *English Flora* (vol. iii. p. 428.), makes it a generic character of *S*enècio, that the style is "the length of the stamens," whose anthers, however, are not always, as in the present variety, wholly within the corolla. Another anomaly in the florets of this variety consists in the length of the ovarium; being twice that which it has in the

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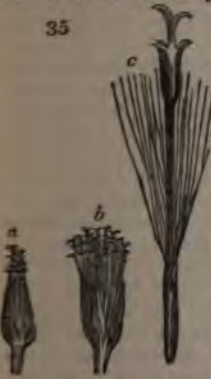
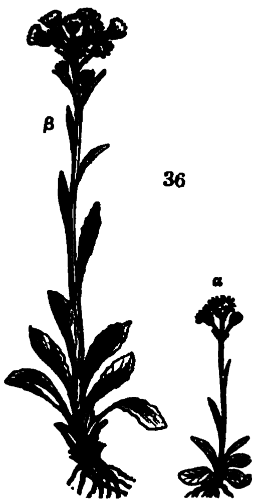


ordinary state. The stigmas, anthers, and pollen appeared to be quite perfect, and to possess their usual characters; but I believe that all the seeds would have been abortive, at least all the ovaries that I dissected were incomplete. We may probably ascribe the elongation of the style and ovarium to their appropriating that portion of nutriment, which would otherwise have been employed for developing the embryo. I am, Sir, yours, &c. — *J. S. Henslow. Cambridge, Sept.* 6. 1831.

Fumària Vaillántii, a British Plant. — I had gathered this plant on Chatham Hill, Kent, about five years ago, and had placed it in my herbarium as a variety of *F.* parviflòra; when, accidentally looking over some of the species of this genus with Professor Lindley, a specimen caught my attention which I immediately identified with the Chatham Hill plant. This specimen was subscribed *F.* Vaillántii; and upon my return to Cambridge, I forwarded my own specimen to Professor Lindley, that he might compare it with his. He has decided it to be the same, and I therefore do not hesitate to add this species to our British list. — *J. S. Henslow. Cambridge, Sept.* 16. 1831.

Mr. David Don, on inspecting the specimens marked *F.* parviflòra in the herbarium of Mr. T. F. Forster, has found all of them to be *F.* Vaillántii, except some derived from Kent; and he hence conceives it probable that *F.* Vaillántii is even a more frequent plant than *F.* parviflòra. Mr. Don still considers the description in Smith's *Eng. Flora*, vol. iii. p. 256., to be accurately applicable to *F.* parviflòra, except in the habitats. — *J. D.*

Cinerària integrifòlia, and its Varieties. — Sir, In looking over Sir J. E. Smith's description of Cinerària integrifòlia (*Eng. Flor.*, vol. iii. p. 445.), I find that he was rather inclined to consider the var. β, called by some C. marítima, but not that of Linnæus, a distinct species, but was deterred by the very variable nature of the Cineràriæ nearly allied to this species. He observes concerning it, "It is twice the size of the above (var. *a*), with numerous broad teeth to some of its radical leaves, with four to six flowers in the umbel, nearly twice the size of those on the Newmarket Heath specimens;" i. e. the var. *a*. (*fig.* 36.) My reason for calling the attention of your readers to this is, that on the 8th of last June, when searching on the Gogmagog Hills, near this place, for the var. *a*, which generally grows there in great plenty, I was unable to obtain any specimens, but found the var. β in the greatest plenty, growing in the very same place in which the var. *a* is commonly found. Now, it appears from this that the moisture of the weather during last spring had the same effect here which the vicinity of the sea has at Holyhead, where this large variety was found by Mr. Davies, as recorded by Smith, namely, that of converting this species from the small state in which it is usually found, into the large and dissimilar plant called by Mr. Davies Cinerària marítima integrifòlia. We may, I think, therefore, from the var. β, which was, I believe, not before known in that locality, having last year totally supplanted the var. *a*, which had always previously been found in that place, and was not to be seen last year, conclude that the two are nothing more than varieties of the same plant, caused by difference in the degree of mòisture. I have sent the accompanying specimens, that you may see the great difference in size and appearance of the two varieties; of which var. *a* was gathered on the Devil's Ditch, Newmarket Heath, June 5. 1829, and var.



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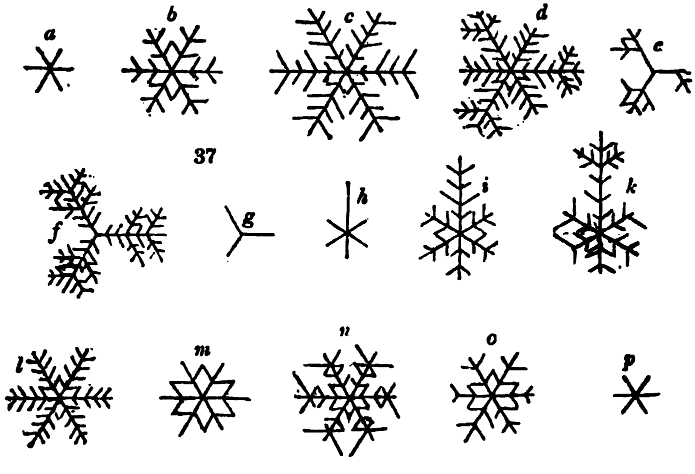
β on the Gogmagog Hills, June 8. 1829. In some specimens of this last there were four or even five stems to one root. It may be as well to add, that the var. β has never before, so far as I know, been found at such a distance from the sea. I am, Sir, yours, &c. — *Charles C. Babington. St. John's College, Cambridge, Feb.* 12. 1830.

Art. III. *Meteorology.*

The East Wind.—The ill effects of the east wind on health have always been noticed. It is well known that air, as it grows warmer, becomes capable of holding in solution (or drinking up) a greater quantity of moisture; a current of cold air rushing into a place which is warmer will, therefore, dry up a great deal of wet. For this reason, damp clothes in winter, placed in the open window of a warm room, dry uncommonly fast. Now, it is well known that nothing is more pernicious to the health than a sudden drying up of the perspiration. Whether this be owing merely to the cold caused on the skin by the evaporation of so much moisture, or to the deranging of some other link in the animal economy, need not be asked; it is sufficient that the fact is so. For this reason, exposure to any current of air which is acquiring heat, and is therefore becoming drier, is uncommonly prejudicial. Every one has observed how disagreeable are currents of air in warm rooms; in fact, the warmer the room, and the nearer we are to the fireplace, so much the more annoying is a draft from any of its crannies. Such a current, increasing in heat as it passes from the cold of the external air to the warmth of a room, will absorb double its former moisture, and of course will dry the perspiration on the body faster than it can be supplied, causing by that means rheumatism in all its forms, toothache, headache, &c. Now, it is evident that the same reason which causes a draft from the open air into a room to be disagreeable, will cause any wind blowing from a cold region into one that is warmer, to have exactly the same effects. The east wind is in this predicament; it blows from a colder continent, which retains the cold of winter longer than the marine tract on which we are situated, the temperature of which is more equal, and at such times warmer. Damp or misty winds are also proverbially hurtful, and their injurious effects seem to arise from the moisture continually deposited by them on the body, which is evaporated by the natural heat, and causes in that process an unusual and hurtful degree of cold, or diminution of the animal temperature. — *N.*

London Fogs.— Mr. Davy, the brother of Sir Humphry Davy, was, I believe, the first person who broadly laid it down that fogs arise whenever the air becomes colder than the water. From this principle we can draw the following conclusions: — 1. Fogs will be most frequent in autumn, after the earth has been heated during the summer, the air cooling faster than the earth. 2. Fogs will be greatest after the hottest summer. 3. Fogs show that the air has become suddenly colder, and therefore are a sign of snow. 4. Fogs will be rare in hot climates, where the air is usually very hot. 5. Fogs will be very frequent in the arctic regions, where the sudden depressions of temperature are enormously below the mean temperature. 6. Fogs will be most frequent over shallow water, which sooner partakes of the temperature of the bottom, than the deep water. The end of the deep water is known, near the banks of Newfoundland, by the sudden commencement of the fogs. The thick fogs which appeared during Captain Franklin's last expedition prove that the sea is very shallow, and the mean temperature not very low, upon that part of the arctic coast. 7. If the London fogs have increased during late years, it will prove either that the mean temperature has increased, or that the variations of temperature have increased, or that a disproportion of temperature between the water and air has increased, or that the Thames has diminished in depth. It is my belief that the last has occurred, partly from the natural rise of all embanked river beds, and partly from the effect of Waterloo Bridge. This bridge is unhappily placed near a bend of the river, and it is to be feared that the allignment of the arches of the other bridge, and the course of the current, have not been duly considered. The only remedy is to narrow the channel, so as to increase its depth, upon some such plan as Colonel Trench's. The quays of the insignificant Seine are open, the Thames is inaccessible. It is, however, very dubious whether that great work would pay as a commercial speculation. (*Courier*, Nov. 20. 1827.)

On the Crystallisation of Snow. — Sir, Having been so fortunate as to meet with the snow crystals in great plenty this winter, I cannot help thinking that, as I believe they are not often seen in this country, it may be acceptable to some of your readers to have the following short account of them: — On the 4th of this month (Feb. 1830.), and for some days after, the thermometer standing at about 22°, and the wind from the E.N.E. nearly all the snow that fell was of that beautiful stellated form, called by Scoresby, in his work on the *Arctic Regions* (vol. i. p. 477.), the "lamellar stelliform crystals." They consist mostly of six points, radiating from a centre, forming with each other, at that centre, angles of 60°, and having commonly additional ramifications on the primary ones, in the same plane with them, and forming angles of 60° with the primaries, as in the following figures (*fig.* 37.), of which the form *b* was the most common, and after that *c* and *d*. *e* and *f* were but seldom seen, and *g* I met with but once. The last three appear to be formed by the obliteration of the alternate rays, so as to form angles of 120° instead of 60°; the additional ramifications still forming angles of 60°, with the primaries. *h*, *i*, and *k*, which I did not see myself, but which were communicated to me by a friend, appear to be crystals in a progressive state of formation. The size of the crystals varied from one eighth to one third of an inch in diameter. It appears from Scoreby's table (vol. i. p. 433.), that the time when the greatest quantity of crystals fell was when the thermometer stood between 16° and 22°, and the wind was N.E. or N.N.E.; which nearly corresponds with what was observed here. The forms observed do not exactly agree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with those figured by Scoresby; but *l*, *m*, *n*, *o*, and *p*, are those of his which come nearest to the English ones. — *Cacale. Cambridge, Feb.* 12. 1830.

Anchor Frosts. — *Jan.* 22. 1828. The state of the weather forms a principal part of our every-day conversation; much of our personal comfort, and very often our health, depends on it. The approach of winter is particularly felt, for

> —— "This is the season when
> An icy gale, oft shifting, o'er the pool
> Breathes a blue film, and in its mid career
> Arrests the bickering stream:" *Thomson.*

and which sometimes takes place in a wonderful manner. It is necessary to premise that it is as natural for the element of water to be solid as fluid, and that its fluidity only depends on that temperature of the atmosphere which is marked by Fahrenheit's thermometer at the thirty-third degree: at and above this point, water is fluid; and, below, it is solid, or in the state of ice. From the short days, and oblique direction of the sunbeams, the heat received by the surface of the earth in the day is soon radiated off, and the colder air from the higher regions of the sky descends and reposes on the surface of the ground. At the same time, too, if the face of the ground becomes incrusted by frost, the natural heat of the earth is prevented from escaping to increase the temperature of the air, and this being cooled down to the thirty-second degree, water becomes congealed, and, as the poet has said, the rapid river is even arrested in its course. In ordinary cases, the crystallisation begins on the surface; on every part simultaneously on stagnant pools, if the air be perfectly calm; but on water in motion, whether as that of a stream, or when ruffled by wind, the crystallisation begins at the sides, and gradually shoots across the surface, till the whole is a connected plate, and, in continued frost, increases in thickness from below. But great bodies of ice are formed, and stop the current of rivers, in a very different way, and this, when it happens, is called by the owners of water-mills an anchor frost. In this the ice begins to form at the bottom of the stream (it never happening in pools or stagnant water), instead of on the surface. This unusual phenomenon, so contrary to our common ideas respecting the action of frost, may, however, be rationally accounted for by any one who has attended to it. The streams in which anchor frosts are most commonly seen are such as contain water of different temperatures, viz. surface drainage and land springs, and supplies from main springs. The first are always several degrees colder in winter than the latter, which is never less than 40°, even in the severest frosts. This mixed stream is partially affected by the air when below the freezing point. The colder globules are first frozen, shoot into crystals of various shapes, and may be seen floating on the surface individually, and are prevented coalescing by the intermediate main spring water, which, although warmer, does not entirely dissolve the already frozen particles. In the deeper parts of the river no accumulation of these crystals is visible; but in the shallows, where the water percolates through or over a pebbly bottom, there the crystals are intercepted between the interstices of the stones, and then become heaped together in thick beds, so as even to throw the current out of its channel. At the gratings of the water-gates of mills, the spicula are also accumulated, and are greater annoyances to the miller than the thickest ice on the surface of the mill-pond, because of the difficulty of clearing it away. The fact of the crystals of ice (which are specifically much lighter than water) sinking below the surface, is an attending circumstance which requires explanation. They do not sink from their specific gravity, but in the commotion of the current they are occasionally submersed, and while so are stopped by any obstruction, where they commence and compose the aggregation. — *J. M. Jan.* 22. 1831.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Foreign Notices.*

POLYNESIA.

Notices on the Native Plants of the Island of Rotuma, Southern Pacific Ocean. — This beautiful island, clothed in verdure, has a fertile and picturesque appearance. As its shores are approached, cocoa-nut palms (*Còcos* nucífera), in an infinite number, are seen elevating their feathered tops above the other trees; and, on a nearer approach, native houses can be seen, near the beach, mingling with the beautiful tropical vegetation. On landing, the luxuriance and beauty of the vegetation charms the eye. Near the beach, the fifau (Calophýllum Inophýllum) and several species of the *Pandànus* are seen, apparently enjoying the moisture from the sea. On proceeding farther inland, not only the cocoa-nut palm, with its feathery fronds waving and rustling to the passing breeze, but an infinite variety of shrubs and plants, meet the eye, glowing in nature's most brilliant colours, and teeming with fragrance. Occasionally the wildness and luxuriance of nature gives place to the art and industry of man, diversifying the scene. In a cleared spot are seen the plantations of yams (Dioscòr*ea* satìva, or perhaps aculeàta), and the *A'*rum esculéntum: the root of the latter is much esteemed when cooked, although poisonous in a crude state; the acrid poison being removed by the action of fire. This root, here named ahan, is more commonly known by the name of taro among the Polynesian Islands. Plantations of sugar cane (Sáccharum officinàrum), bread-fruit (Artocárpus incìsa et var.), and plantains (Mùs*a* paradisìaca), are also seen; and, although all are cultivated in a rude manner, this cultivation sufficiently shows the industry of man in a savage state, when stimulated by necessity. There is a large species of *A'*rum also cultivated, named aper by the natives (*A'*rum costàtum), the root of which is also eaten; but the other species of *A'*rum are usually preferred. *

Casuarìna equisetifòlia. Among other beautiful trees is the toa, or Casuarìna *e*quisetifòlia: it has a delicate drooping appearance, and is a tree of very elegant growth. It is usually seen planted in clumps about the villages, or displaying its mournful appearance in the native burial-places (morais), for which its sombre appearance renders it an apt ornament. The wood of this tree is very hard, and of a beautiful dark reddish brown colour; and, from its hardness and durability, has been named iron wood by Europeans. The natives employ the wood in the manufacture of clubs, spears, &c.

Calophýllum inophýllum. Another elegant tree is the fifau, or Calophýllum inophýllum, usually seen growing by the sea-side: it is a lofty branching tree, with thick, ovate, transversely linear, dark green leaves; the flowers are in clusters, of a white colour, with yellow anthers, and have much fragrance; the fruit is, when mature, of a reddish brown colour, and is also fragrant. A scented gum-resin is produced from this tree, which at first exudes of a clear amber colour, but soon after becomes of a greenish yellow. The wood is hard, of a red colour, and handsomely veined; varying, however, in the beauty of its veins; it is close-grained, and, according to the cabinet-maker's phraseology, "bottoms well." It resembles Honduras mahogany in the working, as also, in some degree, in appearance. The tree attains an elevation of 50 or 60 ft.; and about 10 or 12 ft. in circumference. The wood is used by the natives for a variety of purposes; and they value and plant the tree for the shade it affords them, as also for the beauty and fragrance of the flowers.*

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* It is named cabbé at Tongatabu, and apé at Tahiti.

Spóndias dúlcis. A tree highly valued for its fruit is the vi (*Spóndias* dúlcis of Parkinson) [called in English books on botany the Otaheite apple]: it is found also abundantly at the Society Islands. It is a lofty and handsome tree, attaining the height of 60 ft., and a circumference of 12 or 15 ft. It is one of the few trees found to be deciduous in Polynesia. The leaves are pinnate, of a light green colour, with serrate and transversely ribbed leaflets, the petioles are round; the flowers are racemed, small and white; the fruit is oval, in size about that of a goose's egg, and, when mature, of a bright yellow colour; the external covering has a terebinthinate [turpentine] flavour, but the pulp is sweet and pleasant to the taste; it grows in bunches. The core is spiked, and is usually two-celled. An albuminous substance is found in some quantity about the core. This tree yields a resinous gum, of a greenish yellow colour and fragrant odour. The wood is used at Tahiti in making canoes.

Sapindaceous? Tree, near the Genus Euphòria. Indigenous to this island (and the only one, among the Polynesian group that I visited, at which it was observed) is a lofty tree, which appeared to be of the natural family Sapindàceæ, related to Euphòria, and is called thav by the natives: it attains the height of 50 or 60 ft., and a circumference of 7 or 8 ft.; it bears a fruit, about the size of a walnut, with a thin rind, which being removed displays a white glareous pulp, enveloping several rather semilunar brown seeds; the fruit has an agreeable flavour; the leaves are pinnate, large, and of a dark green colour. It is found in fruit about the months of December, January, and February.

Uvària odoràta. On elevated land, as well as occasionally planted about the native habitations, is seen the Uvària odoràta, called mouscoi by the natives. It is a small tree, with somewhat pendent branches. The leaves are ovate-lanceolate, and of a dark green colour; the flowers have long linear-lanceolate petals, of a light yellow colour, with a red spot situated internally at the base of each petal; the flowers have a powerfully fragrant smell, which is retained for a very long time when they are in a dried state. The natives dry the petals, and use them for scenting their cocoa-nut oil. The flowers are succeeded by a fruit, which grows in bunches of ten to eighteen, of small size, and a very dark green colour; each capsule contains six or more small brown seeds, embedded in a white pithy substance.

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* This tree is called tamanu, or ati, at the island of Tahiti, where the wood is used in making canoes, and is also held valuable for shipbuilding. It was formerly a sacred tree, and planted in the morai, where it was death to break a branch, or in any way to injure it. In India, this tree is named cashumpa, and the oil extracted from the nuts is there used as a liniment in rheumatism, &c. The gum-resin, which exudes both spontaneously and on incisions being made in the trunk, is the tacamahaca resin of commerce, which was formerly held in high estimation as an ingredient in warm stimulating plasters, &c. The females of Tahiti use the resin as a scent, as also the fruit, which is possessed of much fragrance, and is said to yield a yellowish dye. The fruit is also scraped, and mixed with the bark of the auté (Broussonètia papyrífera), for the purpose of giving a fragrant smell to the cloth.

The Inocárpus edùlis, or *if* of the natives, is also abundant at this island: it is the maipé, or rata, of the Island of Tahiti; and is called the South Sea [or Otaheite] chestnut by Europeans. It is a lofty tree, attaining the elevation of 50 or 60 ft. The trunk of this tree has a singular appearance, more particularly after it has attained some age: this singularity consists in projections from the trunk, like buttresses, standing out some distance from what seems to be the actual trunk, and may be said to have an appearance of several trees united together; these buttresses extend from the root to the branches, being widest at the base. The wood of this tree is close-grained, but not durable, and is seldom used, except as firewood; the leaves are oblong, long, and of a dark green colour. The flowers are in racemes, small, white, and fragrant. The fruit is highly esteemed, and, when roasted or steamed, has the taste of a chestnut. "It fattens man as well as pig," say the Rotuma natives; and is much used by them as an article of food. The fruit grows in clusters, is flat, and somewhat reniform. The kernel is solitary, and enclosed in a thick tough coriaceous covering, of a dark yellowish colour when mature, and contains much farinaceous substance. This tree is of very handsome growth. At Rotuma I usually observed it growing on the elevated land. At the Island of Tahiti, it appeared to grow most luxuriantly in the valleys, by the margins of rivers, &c.

Urtìca argéntea. By the pathways, growing in a wild state, may be observed the *Urtìca* argéntea, called amea by the natives: the inner bark of which is used by them in the manufacture of a fine kind of matting, as well as of fishing-nets, lines, &c.

Twining Plants. Twining over the dense thickets are seen several species of *Con*vólvulus, as well as a species of Hóy*a* (which I saw also at Tongatabu and Erromanga) bearing greenish white flowers [Hóy*a* viridiflòra ?]; also the foi (*Con*vólvulus brasiliénsis), hoi of Tahiti, with its broad, cordate, dark, shining, green leaves, and bearing a potato-like fruit, which is only eaten in times of scarcity, and then, previously to being used, is soaked for a short time in water.

Fan Palm. Among the palm tribe (besides the valuable cocoa palm) I observed a small species of fan palm, called fakmor by the natives; the leaves of which are used as wrappers for their mats, &c., and also serve the purpose of umbrellas. A native carries one over his head, to shelter him from the fervency of the tropical sun.

A Species of Sàgus. On the elevated land grew (both wild and planted by the natives) a species of *Sàgus*; differing from that found in the Eastern Archipelago, &c., in having pyriform instead of rotundiform fruit: the petioles of the leaves, as well as the trunk, are armed with thorns, growing in a retrorse or downward direction; the back part of the central stalk of the leaflets is also epinated [aculeate]; the fruit grows in large bunches. This palm is called hoat by the natives; and I have seen it growing to the height of 20 or 30 ft. Some natives of Tongatabu, who were on board our ship at the Island of Rotuma, when they saw the fruit, said it also grew at the Island of Tongatabu, where it was called niu sava. I never observed it myself at that island. The natives of Rotuma eat the pith of the tree, which they said "tasted like the mara, or arrow-root." They extract the pith, and rub it down between stones. The fruit is also eaten when very young; that is, the soft pith-like substance which surrounds the hard stone. The fruit, however, is principally kept for planting, as the tree is also highly valued for its fronds, which, on account of their durability, are used for thatching their houses. I should consider this species as peculiar to elevated land, as I never, in one instance, at Rotuma, observed it growing on low land. I have presented a young specimen of this palm to the botanical collection of the British Museum.

Of the Genus Pìper, they have the kava or ava plant (*P*ìper methísticum), which is cultivated for use; and also a twining species, called shas by the natives, which envelopes the trees in its vicinity with its dark foliage.

Of Plants allied to Amòmum. The turmeric plant is abundant, both wild and cultivated: the root is used by the natives in the formation of a colouring substance for daubing their bodies on particular occasions. By cultivation, the roots attain a larger size and better quality. The ginger [*Z*ìngiber officinàle ?] is also seen abundant, wild, and is called rang apua by the natives, and at Tahiti, rea: it is also abundant, wild, at the New Hebrides group.

Dioscòrea, or Yam. The natives of this island have a small species of yam (Dioscòre*a*), named by Europeans the Rotuma potato, and by the natives, ule: it occasionally grows large; but the small ones are considered of the best quality.

The Ahan or Taro (A'*rum esculéntum*) is also cultivated; but, from a deficiency of water irrigation, it is principally confined to the mountain variety. The taro plant requires a moist soil, and that the roots should be kept covered with water: this is indispensably requisite for the production of good taro. If the soil is not sufficiently moistened, the roots become watery, and not eatable. It can be planted at any season of the year, and is propagated by means of the tops and young shoots; and requires about six months to attain perfection. There are also several varieties of mountain or dry land taro; but the roots are not equal to those which grow in a moist or watery soil.

Of the Tho, or Sugar Cane, they have several varieties; but the cane is (as at the whole of the Polynesian Islands) only eaten in a raw state.

*The splendid Barringtòn*ia *speciòsa*, or huthu of the natives, is abundant; as also at Tongatabu, where it is named futu; and at Tahiti, where it is named hutu. It is lofty, branchy tree, and bears a profusion of magnificent pinkish flowers, which are succeeded by a large quadrangular drupe containing a four-celled nut: it attains the elevation of 40 or 50 ft., and a circumference of 10 or 14 ft.: the leaves are entire, obtuse, shining, coriaceous, and of a dark green colour. The wood is seldom or never used, except as firewood; but the fruit is used (as at Tongatabu and other of the Polynesian Islands) for poisoning fish.

Pandànus, *Species and Varieties of.* There are several species of the *Pandànus* on the island, bearing the native names hoshoa, pauhuf, sahang, and hat. The first attains a very large size, and the foliage is several feet in length. The fruit is of great magnitude; one I procured weighed 60 pounds. The pauhuf is the male tree of the *Pandànus* odoratíssimus (the female tree has a distinct native name of hat); the floral leaves are of a milk-white colour, and very fragrant. I am not aware that the farina or pollen is possessed of any fragrance. The younger leaves of the species named sahang are bleached, and afterwards used in the manufacture of the varieties of matting, named by the natives apé sala, &c.; and from the older leaves a coarse matting is manufactured, named ehap.

Of the Pori, or Plantain Tree (*Mùs*a), they have several varieties; and they have also the mountain variety (the fei of Tahiti) named shai. This variety differs in its mode of growth from the lowland varieties, in having clusters of fruit rising erect from a short thick stalk in the centre of the tuft of leaves at the summit, whilst the others have them pendent from the stem. The mountain variety, when roasted, either when green or mature, is excellent; but, when raw, has a roughness, even when ripe, which renders it not very agreeable to eat. The colour of the fruit externally is of a bright orange, and internally the pulp is of a bright yellow. The broad expansive leaves are of a very dark shining green. The trunk, on being cut, yields a quantity of purplish-coloured juice: I collected some quantity of it during my visit to the Island of Tahiti, in October, 1829.

A Species of Urània. On the elevated land, I found a species of Urània in flower.

An Aroideous Plant. There is a plant, abundant at the Polynesian Islands, as well as in the Eastern Archipelago, with a long rough petiole terminating in a pinnatifid umbellated leaf: it resembles much an *A'*rum in growth, and is probably a species of *Caladium;* it is named shoa at this island (and tévé at the Island of Tahiti). The roots possess very acrid properties. A young chief (Iraf), when I gathered a specimen at Rotuma, which he thought I intended to eat, observed, "No good, you eat it make mouth sore."

Marânta arundinàcea, Tácca *pinnatífida, &c., supply the Arrow-root of Commerce.* The farina or flour from the roots of various tribes of plants constitutes the arrow-root of commerce. In India it is prepared from the Marânta *a*rundinàcea, and at Tahiti and other of the Polynesian Islands from the *Tácca* pinnatífida: this latter plant is seen growing in a dry soil, on low land, and sometimes also on the declivities of the mountains. The leaves arise from the root by petioles, which are from 1 ft. to 1½ ft. in length; they are pinnatifid, umbellated, broad, and of a light green colour; from the centre of the foliage arises a tall, erect, naked, flowering stem, bearing flowers of a greenish colour, which are almost unbellated, with some pedunculate, others almost sessile; the peduncles are capillary, intermixed with long hanging filaments; the involucre is composed of several large sessile leaflets, sheathing at their base, longer than the flowers. The fruit is an oval berry, narrowed at both extremities; and, when ripe, of a greenish yellow colour, has six longitudinal ribbed marks externally, and contains numerous small light brown seeds, striated longitudinally, and embedded in a watery pulp. The roots are roundish, of a reddish colour; and, in an unprepared state, are possessed of acrid properties. At Tahiti and the Sandwich Islands, this plant and the farina produced from it is named pia; at the Island of Rotuma, mara; at the Island of Tongatabu, maa-euah; and at the Island of Tucopia, massoa. When the leaves perish, which occurs annually, the roots are dug up, and are prepared, at this as well as the other Polynesian Islands, in the following manner: —The roots are washed, and grated on a piece of coral into a large bowl of water; the grated portion is afterwards strained through a sieve (generally made from the fibrous net-like covering found at the base of the frond of the cocoa-nut tree); and the farina or flour settles at the bottom of the vessel: the water is renewed daily, until the farina assumes a very white appearance; and by this process the acridity of the root is also removed: the farina, when taken out, is found formed into a solid mass: it is then broken into pieces, and well dried in the sun. Formerly, the natives of Tahiti formed the farina into large balls. These the sun not being able to penetrate, the interior was usually moist and damaged, which occasioned it to get into disrepute as an article of commerce: they now adopt a better method. This farina or flour is found excellent for bread, when mixed with one half of wheaten flower, and is used by the missionaries at Tahiti in that manner, as their supplies of flour are very precarious; it is also used as a starch for linen, &c.

Bonnets of the Native Females. The native females at the Island of Tahiti prepare the stalk of this plant in the following manner, and, plaiting it, use it in the manufacture of bonnets (they also use a kind of grass in the manufacture of bonnets). The stalk of the *Tácca* pinnatífida is split down, and, the inner substance having been scraped away with a shell, is frequently again scraped, with the addition of water, until it is well cleaned; the outer green epidermis is then removed, in a similar manner, from the other side, which seems to be the most difficult part of the process: after this has been done, a fine shining white thin substance remains, which, after being dried in the sun, is ready for use. The bonnets made from this material have a neat appearance. — *George Bennett, F.L.S. M.R.C.S., &c. London, December* 5. 1831.

Art. II. *Monthly Calendar of Nature for Scotland.*

Extracts from the Meteorological Register kept at Annat Gardens, Perthshire, N. lat. 56° 23½′, above the Level of the Sea 172 Ft., and 15 Miles from the Coast; being the Mean of daily Observations at 10 o'Clock Morning and 10 o'Clock Evening.

Results for October.

Month.	Mean temperature.	Mean of dew point.	Mean of minim. temperature.	Mean of barometer.	Depth of rain in inches.	Depth of evaporation.
October 1. to 10.	52·9°	48·2	43·2°	29·30	3·00	·21
10. to 20.	55·3	53·5	48	29·38	1·01	·35
20. to 31.	54·7	49·4	42·7	29·34	·70	·40
Monthly mean	54·3°	53·3°	44·6°	29·40	4·71	·96

The average mean temperature for October, at this place, is 48·4°. This season it has been nearly 6° higher, and 4° higher than in any corresponding month for the ten past years. The heavy fall of rain in course of the first ten days, amounting to 3 in., is also of rare occurrence. The dew point was also nearer the mean temperature, and the evaporation less, than usual. The following are the

Results for November.

Month.	Mean temperature.	Mean of dew point.	Mean of minim. temperature.	Mean of barometer.	Depth of rain in inches.	Depth of evaporation.
Nov. 1. to 10.	38·5°	36·0°	32·9°	29·32	·80	·21
10. to 20.	36·9	35·5	31·3	29·33	3·10	·31
20. to 30.	43·6	40·0	36·9	29·84	·40	·18
Monthly mean	39·6°	37·1°	33·7°	29·49	4·30	·70

The average mean temperature for November, at this place, is 42·3°, This season the unusual warmth in October was followed by a severe storm of frost and snow early in November.

The lowest temperature in October was on the 27th: extreme cold, 39°; wind north-west. The warmest day in that month was on the 18th: mean temperature of that day, 62°, an elevation which it seldom reaches in October in this climate; extreme heat, 68°; wind westerly. On 26 days the wind blew from westerly points; on 2 days, from easterly points; and on 3 days, it was variable. There were loud winds, about the velocity of 10 miles an hour, on the 22d and 30th. There were 9 days of clear, and 3 of partial, sunshine; on 18 days the atmosphere was cloudy.

The coldest day in November was on the 19th: mean temperature of that day, 20°; extreme cold, 22°; wind north-west. The warmest day in that month was on the 12th: mean temperature of that day, 53°; extreme heat, 57°; wind west. On 13 days the wind blew from west and south-west; on 6 days, from north-west; on 7 days, from due north; and on 4 days, from easterly points. There were 10 days of clear, and 2 of partial, sunshine; 18 were cloudy.

The copious rains, and unusual warmth, in the early part of October, produced a sort of late autumnal growth in trees and shrubs, which has made them more tenacious than ordinary of retaining their foliage, notwithstanding the severe frosts in November. The laurustinus was in full blossom by the end of October; and on the 5th of November the Highland hills were covered from to 1 to 2 ft. deep with snow: violent winds from the north-west, blowing over the snow-clad hills, gave early indication of a storm, which followed on the 16th, and several subsequent days. The storm had spent its rage by the 20th; and on the 23d the thermometer stood at 53°, or 29° higher than on the 19th and 20th. In the fields early sown wheat is rather forward, much having the coronal roots already formed; a general precursor of a small ear, these roots being often hurt by the winter or spring frosts. Wheat sown on the 3d of November is just beginning to appear, but is not yet fully brairded. The fieldfares and wild geese arrived in the low carse [vale] early in November. In the cultivated districts partridges have been strong, and in great plenty; and the moorfowl afforded fine sport (if sport it can be called) on the hills. The *A'*rbutus *U'*nedo was in full blow by the middle of October, and its berries [those from the blossoms of October, 1830] are now assuming a scarlet colour. *N*arcíssus, and other bulbous-rooted plants, begin to send their foliage above ground. The flowers of the sweet-smelling coltsfoot (*Tussilàgo fràgrans*) have been nipt by the frost, when left in the open air; no plant pays better with scent in the green-house in the winter months. The Trítoma mèdia shows a vigorous flower stem in the open border, notwithstanding the late severe frost; and the Aponogèton distàchyon is now in full blossom in a well where the temperature of the water is 47°. — *A. G. Annat Gardens, December* 1. 1831.

ART. III. *Retrospective Criticism.*

The Rot in Sheep, as remarked on in Vol. IV. p. 284. 472. — D. N. has had but few opportunities, I fear, of examining sheep in the early stages of the rot, or he could scarcely have hazarded his theory of the biliary circuit and deposit of tubercles on the liver. (Vol. IV. p. 472.) It cannot, I conceive, be demonstrated that bile is thrown back upon the system, and mingles with the circulating fluid; for in the early stages there is no obstruction to the bile; and in the latter, what little is secreted is intercepted by the flukes (Vol. IV. p. 284. fig. 51.) on the hepatic side of the gall-bladder. The eye, which D. N. takes as an index to the bilious condition of the system, has really not that "tinge of yellow and jaundiced-like appearance" at the commencement of the disease. On the contrary, the peculiar whiteness of the eyes is the first symptom which guides the shepherd to the unwelcome truth. If the bile ducts be carefully examined in the earliest stage of the complaint, there will be found a few flukes in the duct which conveys the bile from the gall-bladder to the intestine, but none in the gall-bladder, and none beyond it, a sound liver, no "tubercles," no "abscesses," and withal a fine fat healthy-looking carcass. If it be in the latest stage when the examination is made, the gall-bladder will be found filled with flukes instead of bile: and the animals will be seen making their way up those channels which convey the bile from the liver to the gall-bladder, arresting it in its course, and pressing forward and enlarging the biliary tubes. Thus, when but few of these animals have possession of this viscus, its function is not materially impaired; the parenchyma, or substance of the liver, is unaltered in appearance; the mucous channels, which convey the bile to the gall-bladder, and from the gall-bladder to the intestines, have not yet felt their presence, and the bile itself is secreted apparently unaltered in quality or quantity: but here, as they live in a medium of perpetual nourishment, they multiply to an extent incredible, and impede the natural action of the liver and subordinate organs of the body. They at length completely block up the conduits of bile, devouring the bile as fast as it is secreted; spreading irritation and disease from the vessels in which they live to the whole mass of the liver itself; and in some instances they carve their way through the membrane which encircles them, and escape by myriads into the cavity of the abdomen; thus completing the destruction of an important organ, and with it the life of the animal. These extreme states are generally associated with dropsy and a total degeneracy of the muscular tissue; the blood is deficient in quantity, very serous, and almost destitute of fibrin. A correspondent (Vol. IV. p. 284.) enquires the class and family of the fluke, in hopes of *finding a remedy* for a disease so fatal. He will find it in the class *Vérmes*, and order Intestìna, and it is the Fascìola hepática. Contemplating it, as it is, as a variety of exotic worm, it occurred to me that vermifuges, destructive to other species, might be employed with advantage against this. But in instituting experiments on the living animals, I discarded those popular remedies which have only a mechanical action, and which could never reach the liver, for those which operate by a wider range of influence. What I have observed is, that there are in this class of remedies those which have little or no effect when brought in contact with the living fluke; and there are others which destroy the animal immediately. To the first of those which are inert, belong solutions of vegetable bitters, spirits of tar, and several others, which need not be enumerated. To the second, or to those which destroy the animal, belong solutions of mercury and the spirits of turpentine. For example: a little calomel suspended in water, and dropped upon the animal, quickly deprives it of life; and a drop of the spirits of turpentine kills it in a few seconds. The oil of turpentine is a deadly poison to the fluke. The next consideration is, how far it may be safe to administer this medicine to the living sheep, and what probability there is of its disturbing an animal inhabiting the liver. With regard to the first exception, there can arise no difficulty. The spirit of turpentine is borne readily by children, and has been given to adults in doses of a quarter of a pint; it is likewise applied externally to blistered surfaces, and as a styptic to the bleeding mouths of ruptured blood-vessels. There can be as little doubt with regard to the second exception, when we consider the penetrating nature of this drug; when we know that the mere immersion of the hand in it is sufficient to impregnate the urinary secretion; nor can we doubt that its influence will be acknowledged by an organ approximating and communicating with the stomach, and by the worm inhabiting that organ. — *John Brown, M.D. F.L.S. Boston, Oct.* 31. 1831.

Hares taking the Water. — A harbour of great extent on our southern coast has an island near the middle, of considerable size; the nearest point of which is a mile distant from the main land at high water, and with which point there is frequent communication by a ferry. Early one morning in spring, two hares were observed to come down from the hills of the main land towards the sea side; one of which, from time to time, left its companion, and proceeeding to the very edge of the water, stopped there a minute or two, and then returned to its mate. The tide was rising; and after waiting some time, one of them, exactly at high-water, took to the sea, and swam rapidly over, in a straight line, to the opposite projecting point of land. The observer on this occasion, who was near the spot, but remained unperceived by the hares, had no doubt they were of different sexes, and that it was the male (like another Leander) that swam across the water, as he had probably done many times before. It was remarkable that the hares remained on the shore near half an hour; one of them occasionally examining, as it would seem, the state of the current, and ultimately taking to the sea at that precise period of the tide called slack water, when the passage across could be effected without being carried by the force of the stream either above or below the desired point of landing. The other hare then cantered back to the hills. — *W. Yarrell. Ryder Street, St. James's, Nov.* 7. 1831.

Hares taking the Water. — Sir, Your correspondent (Vol. IV. p. 274.) deserves my thanks for his endeavour to set your readers right respecting the Havergate hares, which, it seems, I have unintentionally defamed. Since I last communicated with you, I have also seen the proprietor of the island; and from what he then expressed, I confess that I did certainly "misunderstand" him in what he had previously told me. But on referring to the notes which I made when I was on the island, I find that the steward asserted that he had frequently seen hares swimming across S. V. W.'s formidable barrier; and I perfectly recollect that a conversation took place on the subject amongst the party who were then and there assembled; at the commencement of which I was almost as sceptical as your correspondent (p. 274.). I am obliged to S. V. W. for his correction of my error respecting the mode of colonisation of Havergate by hares: but as my letter to you was intended to relate not an exception to, but an example of, the habits of their race, the principal fact of the hares swimming across the water in search of pasture, or what not, is still untouched; and if only two or three of the hares, which are in such abundance there (and Mr. Edwards admitted, when I saw him last, that this might be the case), have been found guilty of my charge against them, I suppose the judgment cannot be set aside, although I have rashly preferred making Havergate Island a fashionable watering-place for hares, instead of considering it, with S. V. W., a sort of leporine Botany Bay. I believe many of your readers doubted, till your correspondents produced testimonies to the contrary, that snakes would take the water; and, notwithstanding that fact is now well established, I dare say hundreds who do not read the Magazine of Natural History still disbelieve it: and if those who know that hares will also take the water would give their evidence, the Havergate hares might not be supposed so completely exempt from the use of their legs, in a way common to most animals who possess four, as S. V. W. would wish them to be represented. During the march of intellect, I do not see why hares should not be allowed to swim, since we see other animals of the long-eared tribe allowed to elect members of parliament. But I never supposed that every hare in Havergate had got thither by the exercise of any hitherto unknown art or accomplishment; for I imagine that they breed there as well as on the other side of the "formidable aqueous barrier." Allowing that almost every hare was born and educated, or transported to and naturalised in Havergate Island, I do not see how that disproves the assertion of the steward, upon which I commented; nor have I ever met with any act of legislature by which hares are prohibited from imitating, if they are so inclined, the aquatic pastimes of Leander of old, who swam over the Hellespont, under the influence of a passion which, if it did not equally affect all the creatures in the universe, my esteemed friend, Mr. Edwards, might in vain attempt to turn to account in the colonisation of his island. I have the testimony of a Cambrian sportsman, who knows more about hares than I do, and almost as much as S. V. W. does, to the effect that hares will swim across a stream even more than "200 yards in width" in search of food or shelter, and that he can attest the fact in the case of the islands in the northern lakes. If this be true, as I doubt not, the Havergate hares do not perform such an extraordinary feat as is supposed, when it is asserted that they cross a current, by no means "rapid," at certain stages of the tide, and certainly not so wide as S. V. W. makes it. I wish S. V. W. had gone to Havergate; he might have seen there a more interesting thing than a multitude of hares, and a "formidable aqueous barrier" to keep them from playing the truant: he would have seen what, to a geologist, as he is, would be a pleasing subject of consideration, the unfailing spring of water which bursts up from an immense depth below the island, and which is affected only by the changes in the level of the "barrier" aforesaid. After the hares have been well digested, our differences may be washed down by a draught from the said spring; but at present I must leave that phenomenon to a more fitting occasion. The only difficulty touching the hares is in the saltness of the water about the island; but salt is good to season criticism withal, as well as to keep hares from becoming amenable to the vagrant act; and, so that S. V. W. is satisfied that I do not mean to hoax your readers, I do not care, if, in a punning humour, he says of me, in the words of Plautus, "Nec quisquam plus salis, plusque leporis habet." * — *W. B. Clarke. Brussels, May* 13. 1831.

P.S. I have only just seen your Eighteenth and Nineteenth Numbers, or I would sooner have requested you to correct a few typographical errors in the letter in Vol. IV.; such as, p. 190. Leonhard for Lemhard; p. 191. Layham for Logham, &c. — *W. B. C.*

Hares taking the Water.—Your more recent Numbers have come to hand; and I beg to thank your correspondents for helping my unhappy Havergate friends over the stile of S. V. W.'s criticism. I hope he will now spare the "sauce piquante" of his facetious humour, and let my nautical hares take their place on your editorial table, to be dissected and swallowed according to the direction of good Mrs. Glasse, who, when she ordered that "hares" should first "be caught" before "cooked," doubtless never dreamed of shutting them up in an island by way of saving the sportsman the trouble of running after them. Had the Magazine of Natural History been in vogue then, she would probably have written, "First shut up your hares in Havergate Island, and then you can catch them *ad libitum*, and having caught them," &c. &c. &c. I suppose nobody believed Belgians could run, till the other day, when they stretched their legs at Louvain; but in these days of reform, we shall soon hear of greater wonders than swimming hares or flying soldiers, or of other people as easily mistaking as your ex-insular correspondent. — *W. B. C. Brussels, Oct.* 15. 1831.

Eggs containing Chicks not to be successfully hatched if suffered to cool. — I am exceedingly obliged to your travelled correspondent, Mr. Waterton, for his attempted correction of my supposed mistake about hatching, truth being always preferable to hollow authority; but he can know little of me when he represents me as a book naturalist, deficient in "bog education." (Vol. IV. p. 517.) Had Mr. Waterton, however, spent a little more time "amongst books" than "in bogs," he might have learnt a little more accuracy; for his facts brought to prove my "errors" are too vague to support any inference. If he means to say that eggs with chicks in them can be left till they are "cold as any stone" (what degree of the thermometer he does not say), and then successfully hatched, I should advise him to take out a patent for hatching eggs without heat. No practical naturalist will credit the fact. Every naturalist knows that the terns, &c., leave their eggs for whole days uncovered; but then it is in very warm weather. I cannot pretend to have travelled as extensively as he; but so far as I have had opportunities, I have been, not a book but a field naturalist, and constantly make excursions, as often as my very limited income permits. With all your correspondent's opportunities, it is to be lamented that he has hitherto published nothing respecting the economy or faculties of animals of the least use to natural history. If he will take my humble advice, before he publishes any thing else on hatching, he will provide himself with a good thermometer and a stop-watch. — *J. Rennie. Lee, Kent, Nov.* 3. 1831. [Mr. Waterton uses a watch in his observations: see p. 13.]

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* "No one has more of salt [mirth] and hares [pleasantry]."

Eggs when covered and moistened more easily hatched (Vol. IV. p. 517.). — Possessing but very little ornithological knowledge, and certainly without having profited by the advice of Mr. Waterton, of journeying to the East to consult the vizier of Sultan Mahmoud, learned in the language of birds; having, too, wandered amidst the bogs, rather in search of plants than to study the habits of the feathered race, and therefore knowing better the haunts of the pale pimpernel (*A*nagállis tenélla) and the ivy-leaved campanula (Campánula *h*ederàcea) than of dabchick or waterhen, it may seem presumptuous in me to venture a suggestion respecting the covering of their eggs by certain birds when leaving their nests. I know not whether this habit is peculiar to water birds, or whether it is done by all, or nearly all, of the Linnæan orders Grállæ and *A*'nseres, as in this respect my knowledge is limited to the tame duck and the goose; both of which, particularly the latter, cover their eggs with the greatest care. May not this be done rather to prevent the shells from becoming too much hardened by exposure, than for the purpose of keeping them dry and warm, as suggested by Mr. Rennie, in the passage of his work quoted by Mr. Waterton? I believe these shells are naturally hard and thick; and it is a fact well known to the rearers of these birds, that unless they have whilst sitting free access to water, and can return at intervals with moistened plumage to their nests, the embryo chicks find it impossible to break their shelly enclosure, and consequently perish: to prevent which fatal catastrophe, water is sometimes sprinkled over the eggs. It would not, therefore, appear that moisture is injurious to the embryo; but rather that, in the case of some birds, at least, it is a requisite in the process of hatching. I should, however, add, that when the eggs are thus sprinkled with water, it is always tepid, perhaps to resemble, as nearly as possible, the degree of heat it would imbibe from the bird whilst returning to its nest; and that it is also sometimes done, in very dry weather, to the eggs of the common fowl when the process of incubation is nearly completed. Whether doing so is, in all cases, the result of experience, and therefore right, or whether it is only a vulgar error, I leave to others more capable than myself to determine. — *C. P. Surrey, Nov.* 1831.

Sir J. Byerley's Theory, which accounts for Geological Phenomena by the Precession of the Equinoxes. — Sir, I have seen a very specious paper in Vol. IV. p. 308., by an old correspondent of mine, Sir J. Byerley, altogether in error in its reference to any doctrine of mine, and equally so in the doctrine which it assumes.

It is alleged that I promulgated the idea, that the geological changes arise from the precession of the equinoxes: but this I never taught; for the precession produces no physical effect, and no alteration of mechanical power; but merely carries back the nodes; and, with reference to the equinoxes, causes the stars apparently to move forward, or in about 25,868 years to go round the ecliptic. This was not my idea: but I taught that the geological changes arise from the advance of the line of apsides around the ecliptic in about 20,930 years, because the extremities of that line constitute the aphelion and perihelion points; and as in these the difference of distance is 3,000,000 of miles, so a difference of action and reaction arises, sufficient to cause the mobile waters to respect the declination of the perihelion, or point of greatest action. This theory I promulgated at some length in the *Monthly Magazine*, so long since as 1813; and I reprinted the same paper, as one of my Twelve Essays, in 1820.

Both these motions are very distinct, though they are only varied exhibitions of one very simple cause; viz. the necessary circumstance that every body which performs an orbit, as a consequence turns once on its own axis. The earth does so, and thereby gains on its own absolute orbit a space equal to its own circumference, adding a forty-seventh for the moon; and arrives at its nodes in the equator so much sooner every year than in the preceding, thereby creating the exact precession of the equinoxes. The same advance of the stars then carries forward the place of the apses by a proportionate quantity, insomuch that the earth's circumference $+\frac{1}{47}$ for the moon, is an exact mean proportional of the other two quantities. The times are 20,931, 23,190, and 25,868 years; the angles 50·1″, 55·69″, and 61·9″; and the miles in space, 23,317, 25,426, and 27,724; whence it appears the sun's mean distance is 93,820,000 miles.

With reference to the detailed inferences of Sir John, and his friend Guesney, the whole is a whimsical error, arising from globe-makers locating an ecliptic for the practical purpose of determining declination; but the ecliptic of our terrestrial globes is not the ecliptic of nature, which having no terrestrial locality, all the deductions of those gentlemen are gross errors.

When astronomers say the pole of the equator goes round the pole of the ecliptic, they indicate no change in the oblique relations of the equator and ecliptic, but merely refer to the succession of the constellations by the precession or falling back of the nodes. This motion has no physical effect, because it is of no consequence whatever whether one constellation or another is vertical at the equinoxes; but the progression of the line of apsides has physical effects, because it changes the declination of the aphelion and perihelion points by 47°, and of course the direction of the least and greatest action and reaction.

If we want to know why there are tropical productions in northern climates, more than currents would warrant, we seem to have a cause in the narrowing of the obliquity, at the rate of a minute of a degree in 120 years, or a degree in 7200 years. If, then, this law is constant (but I suspect it is a decreasing series), 144,000 years would extend the tropics to the Alps, and 216,000 years would extend them to Liverpool; since which there would have been ten revolutions of the line of apsides, or transitions of the ocean from one hemisphere to another.

The cause of the inclination of the axis of a planet to its orbit is the inequality of its solid masses, the sphere being made up by the waters, but not the density, and the axis passing through the centre of density. The diminution arises from the constant force tending to bring the equator into the plane of the orbit motion, which is assisted by the action of water, air, &c., on the solid masses.

The whole of the celestial phenomena, as I have shown in every instance, are strictly mechanical, and subservient to the ordinary laws of mechanics, without any attraction, gravitation, or other superstitious fancies: but my present purpose is to rescue myself from the mistakes of Sir John Byerley and M. Guesney. They could not have read the essays which they quote, and probably have not seen my protest and supplement. I am, Sir, yours, &c.—*R. Phillips.*

"*Wilson, the Ornithologist,*" did not die "a short time since," as stated in your last (Vol. IV. p. 558.), but in 1809.—*J. Rennie. Lee, Kent, Nov.* 3. 1831.

Mr. Alexander Wilson was born in Renfrewshire, Scotland, on the 6th of July, 1776; emigrated to the United States in the year 1794, and died in Philadelphia, of the dysentery, Aug. 23. 1813, aged 47.—*John Perry. Manchester, Nov.* 23. 1831.

[The first correction dates Wilson's death 1809; the latter, 1813: which is right?]

Art. IV. *Queries and Answers.*

The Chough of Cornwall (*Pyrrhócorax Gráculus* Temminck, *Córvus Gráculus* Lin.). — Sir, In Camden's account of Cornwall, the chough (*Córvus Gráculus*) is thus described: — "In the rocks underneath, and all along this coast, breeds the *Pyrrhócorax*, a crow with red bill and red feet; not peculiar to the Alps, as Pliny imagined. This bird is found by the inhabitants to be an incendiary, and very thieving; for it often sets houses on fire privately, steals pieces of money, and then hides them. Can any of your correspondents in that county inform me how this bird became subject to the charge of arson, and whether it is really as mischievous as above described? — *J. A. H.*

Is the Woodlark of White the Alaúda arbòrea of Shaw? — Sir, White, in his *Natural History of Selborne* (as published in *Constable's Miscellany*), p. 88., refers to the woodlark, as in the following lines: —

"While high in air, and poised upon his wings,
Unseen, the soft enamour'd woodlark sings."

"In hot summer nights, woodlarks soar to a prodigious height, and hang singing in the air." Is the woodlark of White the *Alaúda arbórea* of Shaw? — *E. H. Greenhow. North Shields, Sept.* 22. 1831.

The Ràna esculénta (Eatable Frog) in Forfarshire. — Sir, In the late Mr. Don's account of the plants and animals found in Forfarshire, it is asserted by the author (p. 37.) that a few of the eatable frogs (the *Ràna esculénta* of Linnæus) are occasionally to be met with about the lakes in that district, although rather rare. It is much to be desired that any of your readers, who may have it in their power to visit that county, would endeavour to verify this point by further enquiry and observation; since it is the only instance, of which I am aware, of a native locality being mentioned for this species of frog, whose claims to a place in the British fauna have been considered somewhat doubtful. If they should be so fortunate as to discover the animal, either there or in any other part of the country, perhaps they will be kind enough to make the fact known through the medium of your Magazine. The eatable frog is distinguished from the common sort principally by its larger size, and by the presence of three longitudinal yellow lines on the back. I am, Sir, yours, &c. — *L. J. Cambridge, Dec.* 2. 1831.

Reptiles in Ireland. — Sir, H. N. has communicated (Vol. IV. p. 269. 452.) some account of the birds and quadrupeds found at and near Londonderry. Can he give me any information with respect to the reptiles of that neighbourhood? I have heard it asserted that there are no animals belonging to that class to be met with in Ireland. Can he from personal observation contradict this statement? and, if so, will he be good enough to add what species have occurred to his notice in that country? I am, Sir, yours, &c. — *L. Jenyns. Cambridge, Dec.* 2. 1831.

Agronome, who has resided some years in Ireland, states (Vol. IV. p. 557.), as the result of his experience, "There are neither toads in Ireland, nor snakes to eat them; neither did I ever see a mole there."

Remarkable Appendage to the Eye of Staphylìnus hírtus. — Sir, I have read with much interest the pleasing and instructive communications of Mr. G. Parsons on the visual organs of insects and Crustàcea. (Vol. IV. p. 124. 220. 363.) Having lately captured a Staphylìnus hírtus, upon the eye of which is attached an appendage (to me) of unusual occurrence, I shall endeavour to give as plain a description of it as possible, in the hope that Mr. Parsons, or some of your numerous correspondents, will inform me, through the medium of your Magazine, if it is of frequent occurrence; of

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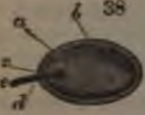

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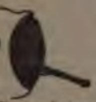

its supposed use; or if only accidental. *Fig.* 38. is a front view of the eye magnified. *a*, The transparent cornea, through which is seen the numerous lenses; *b*, the margin of the eye; *c*, an attachment, round, and thicker than any other part, the base of which is somewhat spread upon the surface of the cornea; *d* is about three times longer than *c*, but about half as thick; *e* is a sort of knob attached to the end, and half as thick again as *d*. *Fig.* 39. is a side view of the same eye. — *D. N. Worksop, July* 20. 1831.

Microgáster glomeràtus. — We have had the pleasure to insert several previous contributions to the history of this interesting little insect. That by T. H., Vol. III. p. 50—52., with its figures, is rich in information respecting it; but that gentleman had the misfortune to apply to the insect the name of *I*chneùmon or Platygáster ovulòrum, which, of right, belongs to a distinct species. Out of this misnomer arose, however, the benefit of Mr. Westwood's scientific correction in Vol. III. p. 452., where, in connection with that correction, valuable information is supplied on the *I*chneumónidæ generally. Mr. Morgan asks a question about this insect in Vol. III. p. 476. under the title of "Flies and Butterflies;" and Mr. Westwood replies to this question in Vol. IV. p. 95. under the title of "Mr. Morgan's Worms." To the same question our esteemed correspondent Mr. Bree also supplied an answer, which, by an almost unpardonable mistake, we inserted in the *Gardener's Magazine*, vol. vii. p. 121. We know no better mode of correcting our error than to reprint the article into this Magazine, that the communication may follow in its due order, and be seen by such of our readers as are not accustomed to peruse both works.

Greenish black-marked Caterpillars on Cabbages. — In your last Number (Vol. III. p. 477.) Mr. Thomas Morgan puts a question concerning a "number of minute eggs" enveloped in a silky substance, and apparently produced by "the greenish and black-marked worms found on cabbages." Presuming that by "the worms" described he means the caterpillars of Póntia brássicæ (large garden white butterfly), which I have no doubt are what he alludes to, I feel no hesitation in referring "the minute eggs" to the pupæ of a well-known small parasite called Microgáster glomeràtus (*I*chneùmon glomeràtus of Linnæus), of whose operations I extract the following account from *Insect Transformations*, p. 61, 62., where a figure of the insect will be found in its different states, together with that of the caterpillar on which it preys. The insect has also already been figured in your Magazine (Vol. III. p. 52.) under the erroneous name of Platygáster ovulòrum as shown at p. 452. of the same volume. "It must have occurred to the least attentive observers of the very common cabbage caterpillar (Póntia brássicæ), that when it ceases to feed, and leaves its native cabbage to creep up walls and palings, it is often transformed into a group of little balls of silk, of a fine texture, and a beautiful canary-yellow colour; from each of which there issues, in process of time, a small four-winged fly (Microgáster glomeràtus *Spinola*), of a black colour, except the legs, which are yellow. By breeding these flies in a state of confinement, and introducing to them some cabbage caterpillars, their proceedings in depositing their eggs may be observed. We have more than once seen one of these little flies select a caterpillar, and perch upon its back, holding her ovipositor ready brandished to plunge between the rings, which she seems to prefer. When she has thus begun laying her eggs, she does not readily take alarm; but, as Reaumur justly remarks, will permit an observer to approach her with a magnifying glass of a very short focus. Having deposited one egg, she withdraws her ovipositor, and again plunges it with another egg into a different part of the body of the caterpillar, till she has laid in all about thirty eggs. It is not a little remarkable that the poor caterpillar, whose body is thus pierced with so many wounds, seems to bear it very patiently, and does not turn upon the fly, as he would be certain to do upon another caterpillar should it venture to pinch him, a circumstance by no means unusual. Sometimes, indeed, he gives a slight jerk; but the fly does not appear to be at all incommoded by the intimation that her presence is disagreeable."

"The eggs, it may be remarked, are thrust sufficiently deep to prevent their being thrown off when the caterpillar casts its skin; and, being in due time hatched, the grubs feed in concert on the living body of the caterpillar. The most wonderful circumstance, indeed, of the whole phenomenon, is the instinct with which the grubs are evidently guided to avoid devouring any vital part, so that they may not kill the caterpillar, as in that case it would be useless to them for food. When full grown, they even eat their way through the skin of the caterpillar without killing it; though it generally dies in a few days, without moving far from the place where the grubs have spun their group of silken cocoons in which to pass the winter."

The above insect has long ago been described and figured by Albin, in his *History of English Insects*, plate 1.; which figure also has been in part exactly copied by Wilkes, in his *English Moths and Butterflies* (see his plate of the large garden white butterfly). As the Microgáster is the destroyer of that "pest of gardens," Póntia brássicæ, it may be considered a beneficial insect.

Very many other lepidopterous larvæ are subject to be preyed upon by parasites analogous to Microgáster glomeràtus, and thus occasionally cause no small disappointment to the breeders of insects, who, instead of seeing a brilliant butterfly or moth proceed from a chrysalis, as they naturally expected, are presented in its room with a number of small flies. I once fed in confinement a caterpillar of Lasiocámpa quércus *Stephens* (large eggar moth), which, after having spun its cocoon, and changed to a pupa, in due time produced a host of small ichneumons*, with long ovipositors, somewhat resembling *I*chneùmon manifestàtor in miniature. The generation of these parasites was a subject which seems to have greatly perplexed our earlier entomologists: "mira, imo vix credibilia aut ante audita," "wonderful things, nay, scarcely credible or before heard of," are the words of Joannes Goedartius, in reference to the above Microgáster; and after mentioning the case of a second and still different parasite which he reared from the same species of the cabbage butterfly, he thus expresses his astonishment: — "Hæc ipse expertus sum, et non sine admiratione observavi; quia præter, imo contra, consuetum naturæ ordinem esse videtur, ex uno eodemque animali, diversæ speciei prolem generari; atque unum idemque brutum, tribus diversis modis procreare; quæ tamen in his erucis, ex iis quæ breviter enarravi, manifesta sunt." "These things I have myself found by experience, and observed not without astonishment; because it seems beside, nay, contrary to, the usual course of nature, that from one and the same animal an offspring of a different species should be generated; and that one and the same creature should procreate in three different ways; which yet is manifestly the case with these caterpillars, from what I have briefly related." (See *Goedartii Metamorphosis, Exper.* xi.) Your correspondent, therefore, it appears, is not the first person who has been amazed and puzzled by the production of parasites from lepidopterous larvæ, though the natural history of these insects is now understood by all who have paid the least attention to the subject. See also *Insect Transformations*, p. 59, 60., for information on the opinions of the earlier naturalists. Yours, &c. — *W. T. Bree. Allesley Rectory, Sept.* 20. 1830.

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* The cocoon and specimens of the ichneumons I herewith send you. The latter, now in my possession, amount to 48 in number; some have probably been lost, and others, I know, have been given away to different collectors. The variance in the size and appearance of the specimens sent, I conclude, arises from sexual difference; the larger ones (females?) are far the most numerous. On referring to these specimens (which I could not exactly lay my hand on when I first sent you the notice) I find they resemble *I*chneùmon manifestàtor much less than I had supposed. This thought has occurred to me: does each species of ichneumon invariably keep to one and the same species of moth or butterfly? or do many of them attack larvæ promiscuously? They are interesting creatures and seful than we are commonly aware.

From the same invaluable contributor we have also subsequently received, on the same subject, the following communication: —

Microgáster glomeràtus. — Sir, Towards the end of June last I observed a brood of the caterpillars of Pónt*ia* brássicæ (large garden white butterfly), amounting in number to twenty four, feeding on the cabbages in my garden. I placed them in confinement; and, as they were nearly full grown, they soon commenced preparing for their transformations. By the 1st of July nine out of the twenty-four had turned to the chrysalis state, and the remaining fifteen produced the silken clusters of pupæ of Microgáster glomeràtus. I mention this circumstance, not at all under the idea of its being any thing new or extraordinary; for I am aware, on the contrary, that it is one of every-day occurrence, and that the subject, too, has already been alluded to more than once in the pages of your Magazines.* The object of my present notice is merely to call attention to the enormous extent to which the destruction of Pónt*ia* brássicæ is effected by the Microgáster. Nine caterpillars only out of twenty-four came to maturity as butterflies, the remaining fifteen (i. e. nearly two thirds) were destroyed by the parasite. Now, if the present instance is to be taken as a fair average example of what usually occurs (and I see no reason why it may not), we should have had this season, were it not for the ravages committed by the Microgáster, almost two thirds more of this already very abundant butterfly than we now have. In the course of a few seasons, supposing no other "preventive check" to come into operation, the cabbage butterflies would increase in a kind of geometrical proportion; our gardens would soon be absolutely devoured and laid waste by the caterpillars; and it would scarcely be possible to walk abroad without being smothered by the winged insects. So greatly are we indebted to this apparently contemptible little parasite (whose operations are unheeded by all but naturalists, and of whose very existence the generality are perhaps scarcely aware), for keeping down the increase of an insect which would otherwise become a serious and alarming evil.

I may observe, that, though the cabbage butterflies did not come forth from the chrysalis till July 18th to 20th, the silken pupæ of Microgáster produced swarms of the winged insect by the 12th, ready to go forth, and commence their destructive operations on fresh broods of caterpillars. — *W. T. Bree. Allesley Rectory, July* 26. 1831.

P.S. August 9. The cabbage butterflies appeared to me to be unusually abundant between London and Dartford the first week in August; I observed them even hovering about the stalls and green-grocers' shops in the outskirts of London, attracted, no doubt, by the cabbages and other vegetables exposed for sale. — *W. T. B. Dover, August* 18. 1831.

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* See Vol. III. p. 52., where a figure is given of Microgáster glomeràtus, under the name of Platygáster ovulòrum; p. 452., where the error is corrected by Mr. Westwood; p. 476., Mr. Morgan's enquiry about the insect; Vol. IV. p. 95., Mr. Westwood's reply to Mr. Morgan's enquiry; and the preceding answer to Mr. Morgan, inserted by mistake in the *Gardener's Magazine*, vol. vii. p. 121.

P.S. Mitcham, Surrey, Oct. 10. Subsequent observation induces me to believe that I have by no means over-rated the ravages of the Microgáster (*fig.* 40.); but that what is stated above, may be considered as no more than an average example of its destructive powers. The chalk cliffs at Dover abound with the wild cabbage (*B*rássica oleràcea), which, as might be expected, affords food to an immense number of the cabbage caterpillars; and, accordingly, the butterfly is exceedingly abundant in that neighbourhood. The latter end of September I saw many of the caterpillars creeping about the cliffs, and undergoing their transformation; and I remarked that those which were infected by the Microgáster, far exceeded in number those which would arrive at the chrysalis state. I have also had occasion to make the same remark in the place from which I date this postscript. I may add, that on the 25th of September, I observed at Dover many specimens of Microgáster in the winged state, adhering to the pupa, from which they appeared to have just emerged; and the same also at Mitcham on the 8th of October. The flies thus produced at this late season of the year, would, no doubt, attack the later broods of cabbage caterpillars; which are often to be met with so late as the end of October, or even in November. The large and continuous supply of this little parasite throughout the summer and autumn, i. e. so long as its services are required, is one of those wise and beneficent provisions, which cannot but excite our admiration. — *W. T. B.*

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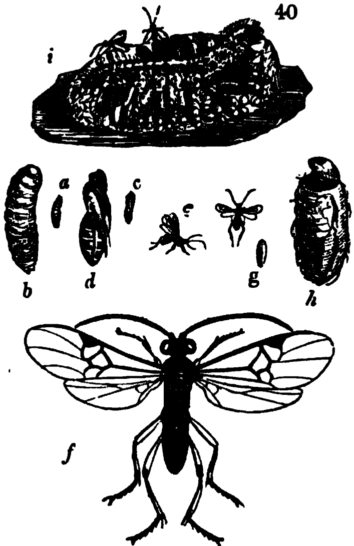

a, Larva of the natural size; *b*, magnified.
c, Imago of the natural size; *d*, magnified.
e, Perfect insect, natural size; *f*, magnified.
g, Cocoon, natural size; *h*, magnified.
i, Cluster of cocoons around the larva of Pónti*a* brássicæ.

An additional instance of the check to superabundant increase effected on a species of Trichiosòma by one of the *I*chneumónidæ, is given in the present Number, p. .

On January 1. 1831. I took a cluster of minute, dirty, pale-yellow cocoons off the face of Kensington Garden wall, and enclosed it in paper. On opening this paper, in the close of the summer of 1831, almost or quite every cocoon had yielded a Microgáster glomeràtus, and the little flies were all dead in the paper. The lids of the cocoons were quite obvious, as shown in the appended figure (*fig.* 40. *h*); some detached, others hinged. In the end of September, or early in October, 1831, along the last 1½ furlong of Kensington Garden wall (beside the Bayswater road), I witnessed nearly a dozen caterpillars of Pònti*a* brássicæ which had just yielded, or were then yielding, both their lives and large clusters of cocoons of Microgáster glomeràtus. These cocoons were then especially conspicuous, from their bright rich yellow hue; but with the dirt of the road, and the filth, which the rain washed off the wall's face, upon and over them, were, in a fortnight or about, so obscured as to oblige me to search to find a cluster. On finding a cluster, I was a little surprised to observe two or three cocoons empty, and to notice a winged Microgáster or two escaping from others. This confirms the remark to the same effect by Mr. Bree, above; and, connected with those I captured unhatched in January, 1831, teaches that the pupæ of Microgáster glomeràtus have not a determinate time for changing into the fly state. —*J. D.*

Microgáster glomeràtus, a hair-like appendage to the abdomen of its larva. — The *P*halæ̀na *B*ómbyx Càja is a frequent prey to the great *I*chneùmon instigàtor (a large black species with red legs, which has a powerful scent), and also to the Microgáster glomeràtus, a small species, which leaves its prey while yet in the larva state, and spins its little silken cocoons among the long hairs of the *B*ómbyx. I observed of the latter insect, Microgáster glomeràtus, a very curious fact during the present autumn, which, as I cannot find it noticed by any author, I shall just mention; hoping that some of your readers may be able to account for it, or throw some additional light on the subject. On opening a larva of Ónti*a* brássicæ, which from its manner I supposed to be infested, I found about 45 of the larvæ of these parasites with their heads apparently inserted in the skin of the lepidopterous larva as if about to make their egress; and to the end of the abdomen of each was appended a long transparent process, about the size of a hair, which I could not separate from the little grubs without causing their death. I repeated the experiment on several other larvæ of Ónti*a* brássicæ, and always with the same result. I had several times the pleasure of observing the grubs in the actual fact of making their exit: on drawing these out I found the same appendage invariably; but when left to themselves, they twisted about for forty or fifty minutes, and thus released themselves from it before they commenced their cocoons. It is possible these beings can thus receive their nutriment, as the human fœtus is known to do, through the umbilical cord? If this be the case, the same may be presumed to hold good in Stýlops; the position of the larvæ of that remarkable insect being the same, with the head "immovably fixed just at the inosculations of the dorsal segments of the abdomen" (*Monographia Apum*, vol. ii. p. 111.); and thus a relation of affinity, as the cant term expresses it, may be eventually established. I am, Sir, yours, &c.— *Edward Newman. Deptford, Nov.* 1831.

Polyómmatus Argiolus, or Azure Blue Butterfly, a double-brooded Insect.— Sir, In reply to Mr. Bree's query, Vol. IV. p. 477., this species is without a doubt double-brooded. I have seen living individuals in April, and again in September this year (1831); and, although not an entomologist, have frequently admired these lovely aeronauts spreading their azure wings, and flitting from flower to flower. — *W. R. Jordan. Lugehay, Teignmouth, Devon, Dec.* 4. 1831.

Caterpillars found in a Book (*fig.* 41.). — Sir, I enclose a sketch of the appearance of the leaves of a closed book, against which, between the boards, were found, in July last, several caterpillars in webs, of which I

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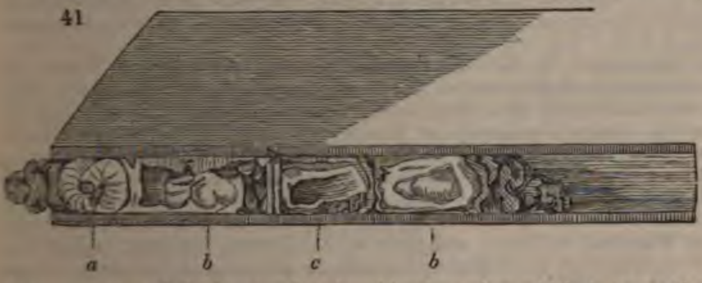

should be glad to know the names and natural history. *a*, Two caterpillars; *b*, *b*, caterpillars nearly concealed by fine webs; *c*, empty cell. — *H.* *London*, *Nov.* 8. 1831.

Unopened blossoms of Drósera rotundifòlia. — Has any person ever seen the blossoms of the round-leaved sundew (Drósera rotundifòlia) fully expanded? It is so represented in the figure of it in the *Encyclopædia of Plants* (p. 233.), but in such a state it has never fallen within my observation. Wishing to obtain a specimen of this little plant with its flowers in full bloom, to sketch from, I have visited, at almost every hour of the day, a bog traversed by a small rivulet, whose margin is thickly dotted with its glowing leaves, looking as if they had indeed impaled drops of the morning dew, to cool them through the day. I have watched it from the time in which its slender scape first rises from amidst a bunch of circinate leaves, to that in which it forms at top into a nodding raceme; but never have I seen its minute white flower-buds unclose. They would always appear as if about to open, and so lead me on in this hope, until the gradual enlargement of the seed-vessel within them warned me to give up the expectation. Does this pretty lover at once of an exposed situation and of moisture, then, never expand its flowers, or does it open them for a short time at sunrise, or when it is hidden beneath the soft twilight of a summer night? Perhaps some one more skilled in botany than myself will kindly answer the question. — *C. P.* *Surrey*, *Nov.* 1831.

The Ore called Mundick in Cornwall. — In the additions to the history of Cornwall is the following curious account of mundick: — "In the working of these tin-mines there has been often found mixed with the tin another sort of ore which was yellow, commonly called mundick; neglected for a long time by the tinners; and when it was worked along with the tin, went all away in a smoke which was looked upon to be very unwholesome: but lately it has been tried and wrought singly by some curious undertakers, and is found to turn to very great advantage, by affording true copper: so that, whereas, before, the value of the tin made it neglected; now, the extraordinary return that copper makes is like to lessen the value of tin. This mundick, as in some respects it is very unwholesome, so in others it is a sovereign remedy. Where there have been great quantities of it, working in the mines was very dangerous, by reason of the great damps and unwholesome steams which, often rising on a sudden, choked the workmen. But for this it makes amends by an effect entirely contrary; for being applied to any wound before it is wrought, it suddenly heals it; and the workmen, when they receive cuts or wounds (as they often do in the mines), use no other remedy but washing them in the water that runs from the mundick ore. But if it is dressed and burnt, the water in which it is washed is so venomous that it festers any sore, and kills the fish of any river it falls into." What is the difference between pyrites and mundick and how many of the qualities formerly imputed to the latter are fabulous? —*J. A. H.*

Humming in the Air. — In the miscellaneous observations of White, the celebrated and often-quoted naturalist of Selborne, published a few years after his death by Dr. Aikin, he mentions an audible humming in the air, which occurs occasionally on the elevated parts of the Sussex Downs, near that beautiful village, on fine still summer days; which he is unable to account for. Many of your readers must have heard similar sounds in their summer rambles. I perceive, on reference to my journal, that the sound was heard on the 24th of June, 1830, on an open part of the forest at Wanstead, in Essex; and again on the Downs, Hackney, in July last. Now, it appears to me that the sounds do not proceed from bees, as you would naturally imagine, but from vast quantities of small winged insects, which at this period of the year are sporting in the air, and in such weather are more stationary; for it is to be observed, that the humming is never heard except on remarkably hot and still days, and always on open places. The sound is exactly as if a swarm of bees were in your immediate neighbourhood, though not one may be visible. Perhaps some of your readers can throw light on this subject. — *O. Sept.* 5. 1831.

Luminous Appearance on the Ears of a Horse. — Sir, Some years ago I met with the following adventure; the *rationale* of which I have never satisfactorily discovered. I will describe it simply as it occurred, leaving you or your readers to elucidate it as best you can. I was returning on horseback one autumnal evening from a journey of about twelve miles, when a heavy rain came on, and continued nearly all the way. Of course I did not take it very leisurely, but came on at a brisk trot; and what with the rain and the exercise, my horse waxed pretty warm. When about half way, on his throwing up his head (an action usual with some horses, when a little distressed for breath), I thought I saw a luminous spot or two on his forehead. I examined more closely: it increased in size, and by degrees extended itself up the ears, till the tips and edges were distinctly marked out by a line of fire resembling phosphorus in colour. Thus it continued for perhaps a mile, until it gradually disappeared; leaving me in no small wonderment at the cause of so singular and fairy-like a visitation. If you or any of your correspondents can throw any light on the cause of this appearance, I think it may be interesting to many, and I am sure will be gratifying to, Sir, yours, &c. — *S. T. Stoke-Ferry, Norfolk, Oct.* 3. 1831.

ART. V. *Obsequy.* By JOHN F. M. DOVASTON, Esq. A.M., of Westfelton, near Shrewsbury.

"Mine be a breezy hill, that skirts the down;
Where a green grassy turf is all I crave,
With here and there a violet bestrown,
Fast by a brook, or fountain's murmuring wave;
And many an evening sun shine sweetly on my grave."

Dr. Beattie.

SIR, As this Magazine is very seldom the vehicle of verses, from the affecting impression made on my heart by the "WISH" of poor Wilson, the great ornithologist, recorded in the Obituary concluding your last Volume (p. 558.), I offer you (though I had on the anvil metal more attractive) a few, written some years ago, in consequence of my having raised a mound of earth in a grove near my residence, for the purpose of my own grave; whenever it shall please the Almighty to call me from this state, where He has so very largely blessed me with happiness, to an eternal existence, which I rationally believe will be perfectly and inconceivably blessed. They are addressed to a near and dear kinsman, with an earnest injunction to him, and my other friends, to see my body there deposited: for, like the above great, good, and lamented naturalist, I had ever a "wish to be buried in some rural spot, sacred to peace and solitude, whither the charms of nature might invite the steps of the votary of the muses, the lover of science, and *where the birds might sing over my grave.*" — *John F. M. Dovaston. Westfelton, near Shrewsbury, November* 10. 1831.

OBSEQUY.

Lay me not in the charnel ground
Where flesh and bones are mangled;
Nor let the sullen death-bell sound,
Nor silly chime be jangled.

But lay me aneath my native trees,
  Where the waving boughs are wreathed;
And let no sound but the sighing breeze
  Be o'er my burial breathed.

Let no proud priest in hollow slang
  Blaspheme or blatter nigh me:
Nor senseless stave, nor nasal twang,
  Be drawl'd or drivel'd by me.

But let the Winter Redbreast sing
  His hymn of Resignation;
Or the full-throated choir of Spring
  Shout peals of Jubilation.

Let no friend's hand be flimsy-gloved,
  No silk-bands sick declining:
But wear the sunny flowers I loved,
  Or ivy green and shining.

Let not my name on staring stone
  With loud bare lies be worded:
What little good or ill I've done
  Elsewhere is safe recorded.

Some men are more than half divine,
  Through every age I greet them;
And their high souls enkindle mine
  Preparing it to meet them.

Then to my honest halls retire
  In Mirth's high revel bright'ning;
Blow every pipe, strike every wire
  To strains I've play'd on lightning.

Taste no cake-sop, no syrup-wine,
  With visage-mockery sober;
But slice the savoury haunch and chine,
  And broach my brave October.

And as with SHAKSPEARE, SCOTT, or BURNS,
  'Mid Fairies, Ghosts, or Warlocks,
Ye wreathe the rosy hours by turns,
  Repeat my glorious *marlocks*.

One bumper of my bright FALSTAFF,
  Ere your gay band be parted,
To me in cordial memory quaff,
  Me — JACK *the happy-hearted.* *

These hests obey, friend-cousin mine,
  So, (when these rites betide me)
Be my bless'd Fate and Fortune thine
  'Till thou art laid beside me.

John Freeman Milward Dovaston.
Westfelton, near Shrewsbury, May 15. 1829.

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* At Oxford they still talk of "Crazy Jack of Christchurch," where they call me (from Homer) Γηθόσυνος κῆρ.

APPENDIX.

(Printed at the expense of the respective Writers. — The additional sheet of "Original Communications," forming part of this Number, is given entirely at the expense of Mr. Vigors, conformably with his suggestion expressed Vol. IV. p. 559.)

Controversy between W. Swainson, Esq. F.R.S. L.S. &c., and N. A. Vigors, Esq. A.M. F.R.S. &c.

My dear Sir,

My absence from England for some weeks past has prevented me from seeing, until within these few days, a letter from Mr. Swainson, printed in your Vol. IV. p. 481., professing to be a reply to my letter to you of the 20th of June last. (Vol. IV. p. 319.) I consequently have not time to take the notice I should wish of that letter in your forthcoming Number; more particularly as matters of greater interest than any subject connected with Mr. Swainson call at this moment for my undivided attention.

I shall however resume the subject in your next publication. In the mean time my cause will suffer nothing from the delay. Your readers have already before them Mr. Swainson's unwarranted attacks upon me, as advanced in his original letter of the 13th of December, 1830; as well as my answers to them in my letter of the 20th of last June: and they can judge for themselves, without any additional observations on my part, whether I have not given a full and triumphant answer to every one of his charges.

Mr. Swainson, in his second letter, leaves all these my answers perfectly untouched: he resorts in it merely to the stale device of a baffled controversialist, that of doggedly reiterating the assertions which had been again and again refuted; and, flying off to subjects utterly unimportant in themselves, and equally irrelevant to the points at issue, exhibits, by his misrepresentations, misquotations, and the contradictions contained in his statements and arguments, but the intemperate ebullitions of disappointed malice. To these new points of discussion I shall address myself one by one in your ensuing Number.

There is also a letter in your last Number (Vol. IV. p. 487.) professing to be the production of M. Lesson. As that gentleman seems not to understand the nature of the subject at issue between himself and me, but to view it through the medium of others, certainly not much more friendly to him than to myself, I shall take an early opportunity of representing to him and to your readers the real state of the question.

I remain, dear Sir faithfully yours,

N. A. Vigors.

Regent's Park, Dec. 10. 1831.

The Swainsonian Controversy. — Sir, I am exceedingly averse to mingle in the controversy between Mr. Swainson and Mr. Vigors; but I owe it to my own character to say, that Mr. Swainson has published extracts from my letters to him, which I expressly told him were private: because, after I had, in the passage published Vol. IV. p. 485., stated to him my difficulty as to whether Mr. MacLeay's system was considered by himself and his disciples a natural or an artificial system (thinking, as I still do, that, in matters of science, such as this, there ought to be no privacy), I received a letter from Mr. ——, saying that his remarks on my objections to the quinary system were for my "private and individual consideration." With the next post I accordingly wrote to Mr. Swainson, enjoining him not to publish this opinion of Mr. ——, that he considered the system artificial which I had thus, unconscious of wrong on my part, requested his (Mr. Swainson's) opinion about. But, without further communication on the point, Mr. Swainson has published this very passage. This explanation will, I hope, save me from being "felled with a 4to volume," as M. Desmarest was afraid of. (Vol. IV. p. 488. note.) With the above reservation, so far as I am personally concerned, I care not if he publish all my correspondence about the quinarians, who, one and all, seem determined to mystify the world as to what their system is; each and all asserting that nobody, not even themselves individually, understands it. After all, is it worth understanding? I have been abused, indeed, by more than one respectable journal for treating the subject seriously. Controversies of this kind seem to me to do good in the end, though they for the moment foster ill feelings: they certainly (as in the cases in your Magazine) bring the combatants to their true level, and tend to clear up disputed facts. — *James Rennie. Lee, Kent, Nov.* 3. 1831.

Swainson's Zoological Illustrations.

Sir,

Your readers and yourself, I suspect, are more than tired of the various controversies, and somewhat angry disputations, which have of late occupied no inconsiderable space in the pages of your Magazine. I cannot forbear, however, adding a few words, and they shall be but a few, in answer to Mr. Swainson's reply in your last Number (Vol. IV. p. 554.), on the subject of his *Zoological Illustrations.* Mr. Swainson observes that "my arguments touching this work are built on a false foundation, and that my inferences, consequently, are unjust." He then proceeds to state his reasons: — First, he says, "the work is not published by subscription; therefore there can be no subscribers." Now, this is a truism, which, consequently, no one will have the hardihood to deny. But I really am surprised that Mr. Swainson should catch at such a broken reed, and attempt to rest any part of his defence on so flimsy a foundation: for who does not perceive that I employed the term "subscribers" as synonymous with that of "purchasers;" a form of expression this, continually in use with periodical authors and editors themselves, in reference to those who buy their works? And be they subscribers, or be they purchasers, who are imposed upon, or whatever else they may be, is a matter of little or no moment; since imposition is wrong, and to be deprecated, be it practised upon whom it may. Secondly, Mr. Swainson says, "The prospectus of the new series stated that it would be published similarly to the old series. There is, therefore, nothing 'unwarrantable' in the charge I complain of. The purchasers are told at the commencement what they are to pay, and what they are to expect." I have not the prospectus by me to refer to, and therefore will take Mr. Swainson's word for the truth of the foregoing statement: but, admitting the case to be as he says, still he appears to me to be only shifting the *onus* one step farther back, and transferring the blame from the author of the second series, now in the course of publication, to the author of the first series, commenced, I believe, in 1820–1. For, let me ask one question: Was it stated in the original prospectus or advertisement of the first series, or even on the cover of the first number published, that the purchasers (I must not call them subscribers) were to be charged, 2*s*. 6*d*., at the conclusion of each volume, for a few pages of title-page, preface, and index? If Mr. Swainson will tell me, on the word of a gentleman, that such notice was given; though even in that case the extra charge would be, I should say, a very injudicious and objectionable mode of reimbursing himself; — but if, I repeat, such notice, or any thing equivalent to it, was given, then there is an end of the controversy, and I shall be ready to acknowledge that, in strict justice, I have no right to complain. But if it was not, I do hold this charge to have been a very unwarrantable transaction in the first instance, and only to be defended now by means of a bad precedent. The case amounts to this: — Unless I greatly mistake, the extra-charge was made without notice, and in an underhand way, during the first or old series: at the commencement of the second or new series, the purchasers and the public are plainly told that they are to be treated in the same manner. To myself individually, and to every one, I suppose, who takes the work, the extra-charge of 2*s*. 6*d*. at the end of each volume can be but a trifling consideration in a pecuniary point of view: but I detest any thing bordering on imposition or unfair dealing. I hear the transaction I allude to universally reprehended; the author reflected upon, and his good faith impugned; and I see, moreover, periodical works in general fall into neglect and disrepute with many, in consequence of these and similar practices. Of Mr. Swainson, as an author and a naturalist of eminence, whose beautiful works are before the public, every one must think well; of his private character, too, I happen to have heard, from those who know him, some traits which would do honour to the character of any man: it is, therefore, the more to be regretted that such a man should lay himself open to the imputation of shabby dealing, and that, too, for the sake of so trifling a remuneration. Mr. Swainson will excuse me for saying one word more, not in the spirit of angry complaint, but in perfect good-humour and good-will, on a point which concerns himself, perhaps, as much as his purchasers: I allude to the irregularity in the publication of the numbers, and to what I may call the absence of notification, or want of making such publication known. My bookseller has a general order to supply me with the numbers as they come out. My last number (xvi.) I received so long ago (I quite forget the exact time), and I had so often enquired in vain for the next, that I concluded the work was finally discontinued. It was not till I had seen Mr. Swainson's reply in your Magazine for November, that I was aware that Nos. xvii. and xviii. of *Zoological Illustrations* were published. I then made, in consequence, a fresh application to the bookseller, who supplied the deficiency without delay. Would it not be for Mr. Swainson's advantage rather to put forth his numbers, if possible, at regular stated periods, well known to all concerned; or, if the non-regular system be still continued, to adopt some method of making his purchasers acquainted when the publication has actually taken place, so that they might make their application accordingly? As things now go on, the numbers come out nobody knows when; the booksellers do not take care to procure them, without a renewed and special order; and it is only by accident that the purchasers, some of them, at least, come to know when such order may be given with effect. Mr. Swainson's polite message to me on the subject of returning my copy to him through Messrs. Longman, as well as my own good wishes for the success of his undertaking, have induced me to add these latter remarks, in the hope that they may be of service to him.

I am, Sir, yours, &c.

Nov. 14. 1831. A. R. Y.

THE MAGAZINE

OF

NATURAL HISTORY.

MARCH, 1832.

ORIGINAL COMMUNICATIONS.

Art. I. *Fairy Rings.* By John F. M. Dovaston, Esq. A.M., of Westfelton, near Shrewsbury.

> "'T is very pregnant,
> The jewel that we find, we stoop and take it,
> Because we see it; but what we do not see,
> We tread upon, and never think of it."
> *Measure for Measure.*

Sir,

The fair authoress of *The Mummy* well and wisely observes that "There is an invincible feeling implanted by nature in the mind of man, which makes him shudder with disgust at any thing that invades her laws." To such who study and esteem her laws, there cannot be a truth more triumphant. Yet the unthinking mind of man not only indulges in, but doats on, mysteries without meaning, and superstitions without support. Some of these, indeed, in themselves innocent, have, by the genius of poets, been made the vehicles of elegant amusement, and allegorical instruction; while others, dismal and diabolical, have, by the cunning of bigots, become predatory on society, and blasphemous to Heaven. There is a perverse propensity in unenlightened minds to embrace the incomprehensible, and reject the obvious; and millions at this moment implicitly believe in Nixon's *Prophecies*, and those of Moore's *Almanack*, who smile with coarse incredulity at being told of the rotatory motions of our globe, or the cause of an eclipse: doubting what is demonstrable to a child of the commonest capacity, and admitting what would stagger the soundest philosopher. Like the poor woman who, receiving her son from the West Indies, listened with satisfactory conviction to his marvellous narrations of rocks of sugar and rivers of rum, but shuddered, and gave him the flattest contradiction, when he averred that he had seen fishes that could fly; when a moment's reflection, even of her mind, would have shown as near an affinity between fowls and fishes, as between sugar and sand. But these good though simple souls, "most ignorant of what they 're most assured," whose delight is in the marvellous, did they but turn to Nature, would find her kingdom peopled and furnished with incalculably more wonders, ay, and true ones too (were that any recommendation), and each perspicuously and indubitably indicating almighty power, wisdom, and benevolence, than all the abortions that were ever spawned from the monstrous womb of Superstition; even more incongruous and copious than "the stuff which dreams are made of,"—more charming, more changing, and more enchanting. What are the tricks and transformations of the most cunning necromancer, compared to the metamorphoses of millions of insects, that actually, and almost hourly, unfold before us; from the smooth and compact egg, to the rough and frightful reptile, through the curious mummy of a chrysalis, to the splendid and celestial butterfly? Look at the myriads of monadal and polypodal molluscous creatures that people every part of the multitudinous ocean! Minuteness, indeed, rather than an argument against, is an augmentation of, astonishment; equal wisdom being displayed, and wonder excited, in the articulations of an elephant or an aphis, in the ramifications of a forest or a fern, in the fructification of a melon or a moss; indeed, the last is incomparably the most intricate and interesting. Look at the fantastic and often, at first, repulsive formations, and apparent deformities, of these creatures of the waters, with limbs and organs in every place and shape but what we expect, and tentacles hundreds of times longer than themselves! Why, heraldry itself never came up to these, with all its hippogryphs, dragons, wiverns, hydras, chimeras, and amphisbænas dire. Some flowers that are now brought from abroad are so extravagantly eccentric in composition, so magnificent in structure, and so dazzlingly glaring in colours, that the most imaginative painter would never have thought of limning such. Some parasites so expansive and ponderous, having blossoms many feet in diameter, exist on trailing plants utterly unable to support themselves. Nay, the momentary actions of nature are ceaseless successions of miracle; evaporation, condensation, suspension of odóur, and vibration of sound. Even poetry is surpassed; for what fairy grotto ever equalled the feathery crystallisations of a frosted pane, glistening and sparkling in splendid brilliance? Or what sparry groves or coral caves of the Nereids, deep in the vast abysms of ocean, could ever vie with a silent frost-forest; heavily still, and candied with spikes of hoary rime, spangling and blushing in the earliest beams of the golden sun? What gigantic palace of enchantment copes in splendour with the columnar shafts of icicles congealed around a winter waterfall? or, in curious castellets, embrasures, and bastions, with the masses of powdery snow sifted fantastically through a hedge into a deep lane? Thus, though lost in the immensity of boundless space, all breathing with creation, the humble student of nature, one of the happiest of earth's creatures, may exclaim with the sublime Callias (in *Anacharsis*), " The insect which obtains a glimpse of infinity partakes of the greatness which overwhelms it;" and may cordially say with the philosopher, " Even to such an one as I am, an idiota, or common person, no great things, melancholising in woods and quiet places, by rivers, the goddesse herself, Truth, has oftentimes appeared:" but on opening his eyes on the pampered and artificial world (whether civil or religious), he will feel with King Lear's honest fool, that "Truth's a dog that must to kennel; he must be whipped out, when Lady, the brach, may *lie* by the fire and stink." It is an unconfutable truth, that among people who have made the greatest progress in natural history, their ideas of the Deity have always been more refined, exalted, and sublime; while in the darkness of theirs where that science has slept, or been sluggish, their notions of his nature and attributes have been derogatory, detestable, and even diabolical.

But to my intention; or I shall be like Bayle, who, in his work on comets, has forgotten them, and filled his volumes with every thing beside, eccentrically erratic: and so may I be herein like a stuffed toucan, all bill and no body. I was led into this lengthened preliminary by some reflections on fairy rings, for the cause of which I think I can account, without offence to that airy people, for whom I confess I have a hankering fondness, in consideration of one William Shakspeare, and his fanciful brethren, who have given them a permanent ascendency they long ere this had lost, but for the embalming power of song; so I shall proceed with all due loyalty to the jealous King Oberon, his crown and dignity: confining myself to the two prevailing opinions of their cause; the first whereof I think I shall confute, and establish the second. Let the incredulous in philosophy continue their superstition; this is a harmless one: for though the fairies have long ago left off dropping testers in our shoes, they do not pick our pockets.

It is asserted that these rings are occasioned by centrifugal fungi, which the ground is only capable of producing once; and these, dropping their seeds outwards, extend the rings, "like circles on the water." Fungi I conceive to be the effect, and not the cause, of these rings: and ground producing fungi once, is not incapable of reproductiveness, as the possessors of old mushroom-beds well know; for simply by watering, they will reproduce exuberantly, without fresh spawn, for many years. Besides, we find all these fungi without rings, plentifully; but very rarely without some visible (and never perhaps without some latent) excitement; such as dung, combustion, decomposing wood, or weeds; indeed, the seeds of fungi are so absolutely impalpable, that I have sometimes thought they are taken up with the juices into the capillary tubes of all vegetables, and so appear, when decomposition affords them a pabulum and excitement, on rotten wood and leaves: and this seed is produced in such excessive quantities, thrown off so freely, and borne about so easily, that perhaps there is hardly a particle of matter whose surface is not imbued therewith; and had these seeds the power of germinating by mere wetness alone, without some other exciting cause, all surface would be crowded with them. and pasturage impeded. Now, were these rings caused by the falling of the seeds centrifugally, they would enlarge, which they do not, but after a year or two, utterly disappear; though plenty of the seed may be seen to load the grass all around. I have brought large patches of these rings into other fields, but never found them enlarge; and the turf I have taken back to replace in the rings has never partaken of their nature. Why, too, should the grass be more rank in the rings? one would conclude the seeds of fungi would make it less so. Now, the exciting cause that occasions these fungi, and deeper verdure to come up in circles, the true, the nimble fairies —

> "That do by moonshine green sour ringlets make,
> Whereof the ewe not bites; whose pastime is
> To make these midnight mushrooms"—

I hold to be strokes of ELECTRICITY: and I owe you "the picking of a crow," good Mr. Loudon, for refusing, some time ago, the admission of a gentleman's Essay on Electricity, averring it incompatible with Natural History; when you very well know that no part of organised nature can go on a moment without it, and that no part of inorganised matter* exists, not subject to its pervasive influence.

A very considerable portion of those volleyed lightnings and rolling "thunder, that deep and dreadful organ-pipe," which often keep such awful coil and "pother o'er our heads," has frequently very little or nothing to do with us; for though a nimbus be heavily discharging its rain, cumuli are bagged up in different heights the lobed and thin edges of which may be often seen through the shower, tinged by the flash; as one cloud is giving or receiving the fluid, according as it is more or less disposed. This may be proved by theory: but I have very often witnessed it, safely seated on the tops of very high mountains, in the calm and quiet sunshine and sweet serenity of a blue sky: and some who read this article will remember witnessing it with me on the craggy heights of the Glissegs, and even from so low an elevation as the Balder-stone of the Wrekin. But when a column of electric fluid affects the earth, either ascending or descending (for I confidently contend, in the very face of some modern theorists, that it ascends innumerously oftener than it descends, though I must not pause to prove it here), it scorches the ground all around its edge, where there is plenty of oxygen in contact with it, and leaves the centre unscathed, where the oxygen is either expelled or destroyed, and so fertilises the extremity: the consequence is, that the first year the grass is destroyed, and the ring appears bare and brown; but the second year, the grass resprings with highly increased vigour and verdure, together with fungi, whose dormant seeds are so brought into vegetation, that without this exciting cause might have slept inert for centuries. These fungi are most generally of the *A*gáricus, *B*olètus, or Lycopérdon, sometimes Clavària, genus; I have very rarely seen any other. The fertilisation of combustion, as agriculturists well know, though violent, being of short duration, these circles soon disappear. They are, moreover, generally found in open places, on hill-sides, wide fields, and broad meadows, where lightning is more likely to strike; and seldom near trees or woods, which throw off, or receive the fluid silently and imperceptibly. I have indeed sometimes seen one all round a tree, which must have been by a stroke, from which trees are by no means exempt. I confess I have never been able to produce a single spot by electricity: though a learned friend and myself one summer collected and repeatedly discharged a prodigious accumulation of battery on the grass-plot before my dining-room window: but it requires, to produce a very small ring, an incalculably larger column than it is in the utmost power of man to accumulate or discharge. The following year, however, my friend was pleasingly amazed at beholding a noble fairy ring on the very spot! and was long in doubting suspense, till I informed him I had made it with what really acted on the same principles, — fresh soot.

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* Excepting glass, and a very few others similar; to which, however, it may be most easily communicated by the intervention of metal, and made to retain it perfectly when the metal is removed.

I remember (though for relating it "I may chance have some odd quirks and remnants of wit broken on me"), when a youth at Christ-church, some Oxford wags traced with gunpowder, and fired on the short-mown grass of the Grand Quadrangle in that College, in large capitals, the short monosyllable that so much appears to puzzle poor Malvolio in the epistle forged by his Mistress Olivia's chambermaid; and to the affected indignation of the old dons, and the titillatory fun of the merry Oxonians, the little word flourished there in brown and green for two years; and may be still talked of yet in those frolicksome regions, by such humourists as,

Sir, yours,
John F. M. Dovaston.

Westfelton, near Shrewsbury,
Dec. 30. 1831.

Art. II. *An Essay on the Analogy between the Structure and Functions of Vegetables and Animals.* By William Gordon, Esq., Surgeon, Welton, near Hull. Read before the Hull Literary and Philosophical Society, Nov. 19. 1830. Communicated by Mr. Gordon.

(*Continued from* p. 30.)

Having now given this brief outline of the nervous system, I shall proceed to prove that there is a structure very analogous to it in plants. In the first place, the most superficial observer cannot but have perceived the great similitude that there is between the pith of vegetables and the spinal cord of animals. They are both surrounded by a membranous covering; they are in every way carefully protected from injury; and they both send off branches in a manner precisely analogous: the pith gives off its medullary rays, which are distributed over every part of the plant, exactly in the same way as the spinal cord gives off the nerves, and diffuses them through the animal body. In the second place, phytologists have discovered that the pith contains within its cells a number of globular bodies, resembling nervous ganglia. The number of these nervous globules bears a close proportion to the quantity of pith. Their size and number differ very much in different plants, and in the same plants at different stages of their growth. In the third place, the pith is most abundant, and the globular corpuscles found in it are the most numerous, in plants which are young and growing; the period when vegetable life is in a state of its greatest vigour. So, in infancy, when the increase of the body is most rapid, the nervous system is proportionally larger than in adult age. The brain, at birth, forms the sixth part of the whole body; but in full-grown man it forms only the thirty-fifth part. Some have supposed that the pith is essential to the production of the fruit; some, that it promotes the circulation of the sap; and others, that it supplies the leaves with moisture for exhalation. These opinions, however, have not been established by facts. Indeed, from the circumstances which I have mentioned, there can be little doubt that the pith performs functions very similar to, if not identical with, those of the nervous system. It appears that the one, as well as the other, is the source of vital action: for we find them both presenting the same form, the same arrangement, and the same distribution; and we observe them both exhibiting the greatest magnitude when the functions of growth and nutrition are the most actively exercised, and when the vital power, upon which these functions depend, is required to act with the greatest energy. The other proofs of the existence of a nervous system in plants I have drawn from the effects produced upon them by certain poisonous agents, and also from their capability of preserving a certain degree of temperature under a great variety of circumstances. Most persons are acquainted with the deleterious effects which prussic acid, belladonna, nux vomica, and similar substances are capable of exerting upon the animal frame. If a large dose of prussic acid be administered to an animal, it produces death in the course of a few minutes. If a less quantity be given, it occasions loss of sensibility, and other alarming symptoms. Results similar to these are observed to take place in plants exposed to the influence of prussic acid. For instance, if concentrated prussic acid be dropped upon a plant, it speedily destroys its life; but if the diluted acid be employed, its application is followed only by impaired irritability. Again, if a strong dose of the infusion of belladonna be given to a man, it occasions vertigo, sickness, convulsions, paralysis, and death; if the same infusion be poured over a plant, the leaves become affected with a sort of spasmodic action: they then grow flaccid, and in the space of a few hours the plant dies. Now, it has been long known that the poisonous agents which I have named do not operate injuriously upon the animal body by destroying its fibre, but by interrupting the functions of the nervous system. It therefore seems pretty evident that, since they act in the same manner on vegetables as they act on animals, the former must, like the latter, be endowed with nervous structure. It has been a question among physiologists to determine in what manner poisonous bodies produce their specific effects upon the animal system. On this point several opinions have been advanced. Majendie came to the conclusion that they were absorbed by the veins, and passed directly into the circulation. Brodie supposed that they sometimes operated by entering the circulation, and at others by acting on the sentient extremities of the nerves, and, through them, on the brain. There are others, again, who imagine that they indirectly enter the circulation by absorption through the lymphatics, but that, before they can exert their specific effects upon the general system, they must be brought into absolute contact with the brain. Morgan and Addison, in an essay published about fifteen months ago, argue "that all fair analogy forbids the conclusion, that at one time a poison shall be taken up by the veins, and carried through the circulation to the brain, before it produces any sensible effect; that at another time the absorbent vessels shall take up the substance, and, by their communication with the subclavian veins, be thus instrumental in carrying the specific agent into the circulation, and thence to the brain; and again, at another time, the impression made upon the extremities of the nerves of the poisoned part shall at once, by the medium of those poisoned nerves, be conveyed to the brain, independently of absorption either by the veins or absorbent vessels. . . . As reasonably," say they, "might it be presumed, that at one time the sense of taste was communicated by a branch of the fifth pair of nerves, and at another time by the salivary ducts, as to entertain a belief that veins, absorbents, and nerves individually performed a function of precisely a similar nature." These gentlemen, therefore, after performing many scientific experiments, conclude, and apparently with ·eat correctness, that all poisonous agents produce their specific effects upon the brain and general system through the sentient extremities of the nerves, and through these only; and that, when introduced into the current of circulation in any way, their effects result from the impression made upon the sensible structure of the blood-vessels, and not from their direct application to the brain itself. Since, then, it is proved, that certain poisons can act upon the animal body in no other way than by affecting the functions of the nervous system; and since it is further proved that they occasion their specific effects upon the general frame through the medium of the nerves, and through these alone; and since these poisonous agents produce the same injurious effects upon vegetables that they produce upon animals; I think we have a right to infer that plants not only possess a nervous system, but that they possess one very much resembling that which exists in the animal body. Again, it is well known that both plants and animals have the faculty of preserving a certain degree of temperature, let that of the medium in which they are placed be what it may. For instance, the temperature of the interior of the stem of a tree will seldom sink below 56°, although that of the atmosphere be not higher than 20°. The human body never has its temperature reduced below 98° or 96°, not even if surrounded by an atmosphere cold enough to effect the freezing of quicksilver. Now, there can be no doubt that the heat of vegetables is produced, in a great measure, by various chemical processes going on within their different organs: yet it is very clear that it must arise also from other causes; for it continues to be generated, though in a less degree, even in winter, when every chemical action within the plant is almost entirely suspended. Some have supposed that at this season it is transmitted, through the roots, from the earth in which the plant is growing. But if this were true, how does it come to pass that we sometimes find the water immediately surrounding the roots and their spongioles in a frozen state, while that within them and within the stem is quite fluid? and how comes it to pass that plants situated on the side of rocks, whose roots, from the deficiency of soil, are almost as much exposed as their branches, possess as much warmth within the interior of their stem, when the thermometer stands at 30° below zero, as those whose roots are deeply buried in the earth? Animal heat, like that of plants, likewise depends very much upon a chemical process, viz. the combination of the oxygen of the air with the carbon of the blood, forming carbonic acid. It is not, however, derived entirely from this source. The experiments of Brodie and of Sir E. Home show that it is to a considerable extent generated and maintained by the action of the nervous system.

Since, then, the temperature of the animal body is found to be produced and supported by the functions of the nerves; and since it is ascertained that plants possess the property of always maintaining, under a great variety of circumstances, a certain degree of temperature; and since this property cannot altogether be referred to any mechanical or chemical process, we are bound, I think, to conclude that plants are endued with a nervous structure.

I have already stated that the higher classes of animal beings are furnished with no less than five distinct sets of nerves. The lower orders of animals possess a much fewer number, and some of them have no nerves at all. Dr. Darwin, from what he has advanced in his works, seems to infer that vegetables possess as many classes of nerves as are found to exist in animals of the most complicated and perfect structure. No one, I think, can agree with the opinion of this fanciful but learned and amusing writer. It would be waste of time to show that plants have neither nerves of perception nor of volition, nor nerves of sight, hearing, taste, or smell. To endow them with these, would be to render them at once intelligent beings. On an attentive consideration of the subject, however, it appears to me that some vegetables are endued with nerves of touch, with respiratory nerves, with nerves of motion, and with ganglionic nerves.

The sense of touch resides in the nerves distributed to the skin. It is the only one which appears common to animals. It has been ascertained that zoophytes, many of the molluscous and articulated worms, and the larvæ of various kinds of insects, are not endued with vision; and the sense of hearing is found to be wanting in several species of insects and mollusca. Many animals appear not to possess the faculty of taste; and it is doubtful whether there is an organ of smell in cetaceous tribes, in amphibials, and in worms. There is no animal, however, not even the most simple infusory animalcule, in which the sense of touch does not exist. In consequence of the sense of feeling being so universally present in the animal kingdom, physiologists have considered it to be the most simple and least elaborate state of the sensorial power, or that subtle fluid which is secreted by the nervous system, and constitutes the principle of sensation and motion. There is likewise reason to conclude that from the material of touch all the other senses are produced, by the operation of peculiar and appropriate organs upon it. Thus, the optic nerve converts it into vision, the auditory nerve modifies it into hearing, and the gustatory and olfactory nerves into taste and smell. The sense of touch, besides being distributed over the whole surface of the body, possesses, in the mammal class of animals, and in some birds and insects, its peculiar local organ, as well as the other senses. In man, the local organ of touch resides in the tongue, the lips, and the points of the fingers: in the horse it exists in the nose and tongue, and in the pig it is situated in the snout. We find, however, that those animals which possess a local organ of touch of a complete and perfect kind, and capable of receiving the most delicate impressions, are all furnished with a brain and a complicated nervous system; but in the inferior tribes of animal beings, as the mollusca, shell-fishes, and the larvæ of insects, in which the sense of touch has no local organ, but is merely diffused over the general surface of the body, the brain is entirely wanting, and the nervous system is of a less perfect conformation. From the most satisfactory evidence, then, it seems that the faculty of general touch or feeling, or common sensation as it is called, is the most simple and common of all the senses; and that the presence of a brain is not necessary to its existence, for it is as strikingly displayed in the lowest orders of animals as it is in those which are the most highly organised. Now, it has been observed that temperature produces upon plants effects which cannot be referred to any of its mechanical or chemical operations; we can therefore scarcely entertain a doubt that they are furnished with organs adapted to receive the impressions of heat and cold; in other words, that they possess the nerves of the sense of touch. Whether plants are susceptible of the pressure of contiguous bodies is less certain; but even if they be not so, still the possibility of their possessing nerves of touch is not destroyed or diminished; for it seems that these nerves are divided into two distinct sets, because it is found that we possess a sensibility to temperature, and also a sensibility to resistance, and these two bear no proportion to each other. Cases are not wanting in which individuals have been sensible to the impressions of temperature, and yet have been insensible to those of resistance; others, again, have occurred where sensibility to resistance has remained perfect and sound, while that to temperature has been completely lost. Since, then, the sensations of heat and cold reside in nerves distinct from those which form the seat of the sensations of resistance, it is clear that a living body may possess the former, and yet be destitute of the latter; so that, although plants may be incapable of feeling the resistance of bodies placed in contact with them, they may nevertheless be sensible to variations of temperature. The function of respiration is partly under the control of the will, and it is partly independent of it. For instance, we can breathe slowly or rapidly, and, to a certain degree, we can stop the breathing. The principal agent concerned in carrying on the respiratory function is the diaphragm, which is a large muscle separating the chest from the cavity of the abdomen. I have already mentioned that no muscle will contract, unless its fibres be excited by the application of some stimulus. The involuntary muscles contract in consequence of the stimulus being made to act directly upon them. The heart, for example, is stimulated by the contact of the blood, the stomach by that of the food, and the bowels by the chyle and fæces. The stimulus by which the action of the voluntary muscles is produced is volition, which is sent to them from the brain through the medium of the nerves. Now, it is clear that the diaphragm does not, like the heart and stomach, contract, owing to any substance being immediately applied to it. Neither do its ordinary contractions proceed on the principle of voluntary muscles; for volition is exercised upon it only very occasionally. It must, therefore, have some stimulating power transmitted to it from some source which does not supply the other muscles. Now, it is well known that the diaphragm, besides having nerves of sensation and volition whence it derives its voluntary power, receives likewise a particular set of nerves from the middle of the spinal cord. These nerves are independent of the brain. They are incapable of communicating perception or volition, and have only the power of exciting the fibres of the diaphragm to contract. It is by the peculiar agency of these nerves that the contractions of the diaphragm can go on without our consciousness. Hence it is that we are able to breathe during sleep, and during insensibility from disease. On the banks of the Ganges there grows a plant called the *H*edýsarum gýrans [Desmòdium gýrans *Decandolle*]. The leaves are continually in motion. These motions are connected with the function of respiration; and we are informed by Sir J. E. Smith that they will continue when the plant is removed from the light and every external agent. From this circumstance, they must depend upon some internal cause; and to what cause can we refer them, except nervous power, or something very closely similating it? There seems, I think, very little difference between the motions of the leaves of the Desmòdium gýrans and the ordinary contractions of the diaphragm. They both originate from some internal stimulus: they are both concerned in the function of respiration, and both are unconnected with the faculties of perception and volition. It therefore appears that the Desmòdium gÿrans is endued with something like respiratory nerves, upon the agency of which the motions of its leaves, which resemble the contractions of the diaphragm, entirely depend.

The motions of the animal body are divided into voluntary and involuntary. Now, it appears that volition, or the act of the mind which forms the will, is the chief stimulus of the nerves distributed to the muscles of voluntary motion; for instance, if we wish to move a limb in a certain direction, provided the nerves and muscles belonging to it are in a sound state, it is immediately moved. In this case, a certain state of the brain is induced by volition: this is conveyed to the nerves, which, acting on the muscles, cause them to contract, and to move the limb. But the nerves which place the muscles under the guidance of the will can act upon and produce contractions in these muscles, without themselves being operated upon by volition. This is proved by the act of deglutition in new-born infants, which depends on certain muscular motions. These motions cannot, of course, be regarded as voluntary; because there must always be present in the mind a motive before volition can be exercised; and since there does not exist in infancy any mental feelings whatever, we are bound to conclude that deglutition at this period of life is an involuntary but a spontaneous act. That the muscles of deglutition, during infancy, act in consequence of the stimulating power of the motive nerves, there can be no doubt; because they perform their office independently of all external circumstances, and because they cease to perform it if the nerves ramified upon them be divided, or disabled by disease. It is clear, from what has been said, that the motive nerves can act on the muscular fibre, whether they themselves be acted on by volition or not. In the former case, i. e. when acted on by volition, they produce what is termed voluntary motion; in the latter case, i. e. when not acted on by volition, they give rise to spontaneous motions. It is well known that the pistil of the tiger lily will bend, first towards one stamen, and then towards another, until it has inclined towards them all. Each stamen of the *Saxífraga** will in regular succession approach the pistil, and as soon as it has shed its pollen over it, it retires, and gives place to another. These movements do not depend upon any mechanical arrangement, and they are perfectly unaffected by any external causes. We must, therefore, refer them to some internal stimulus. I must confess that I can see no difference between the muscular motions employed in the act of deglutition during infancy and the motions of the pistil of the tiger lily, or of the stamens in the *Saxifraga*. Both are produced by some internal impulse; both take place in the absence of all external agents; both are exercised without volition; and both are performed to accomplish an important effect in the economy of each. Since, then, it has been shown that the former depend upon nervous action, the latter, which closely resemble them, ought to be referred to the same agent. On these grounds, I conceive that plants, as well as animals, are possessed of nerves of motion.

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* Which, or every species? *Parnássia palústris* also instances the same phenomenon. — *J. D.*

I have already made some observations on the ganglionic nerves: these, I remarked, were incapable of communicating perception or volition. Their office is to unite the whole system together, and to regulate the functions of the stomach, the liver, and other organs of digestion: in fact, they preside over all those functions which maintain, or are essential to, life. These nerves are capable of receiving impressions from their appropriate stimuli, but of these impressions the mind is never conscious: the food, for example, acts upon the stomach, but we never feel its action; the lacteals absorb the chyle and transmit it to the veins, and the blood-vessels circulate the blood to every part of the system, but of neither of these operations have we any consciousness. The sensibility, therefore, of the ganglionic nerves is of that kind which is unaccompanied with perceptibility. When, however, the functions which depend upon them proceed with proper vigour and regularity, the result is a universal feeling of energy, elasticity, and pleasure, which is considered and called the state of perfect health: but when, on the contrary, the ganglionic nerves, and the functions over which they preside, become disordered, the delightful feelings which we denominate health entirely disappear, and others of a most distressing character occupy their place; a general languor and inertness seize upon the body, and the mind grows weak, unsteady, and irresolute, and in more severe cases it often becomes so irritable, gloomy, and desponding, as to render life a state of almost insupportable wretchedness. It has been stated by some writers, with regard to vegetables, that their growth, and the other changes which take place in them, are the effect of mechanical and chemical actions alone; so that, from this view, the life of plants would seem to consist in a physical and *not* a vital connection of their different functions:

in other words, it is inferred that plants can have no ganglionic nerves by which their conservative functions are influenced. This, probably, might have been the case, if the functions of plants had consisted merely of circulation and respiration; but we cannot for a moment suppose it to be so when we consider that the vegetable functions consist of calorification, of absorption, of assimilation, of sanguification, of secretion, and of generation. If these functions require to be regulated and connected together by a circle of nerves in animals, surely they require the same bond of union and regulating power in plants, in which they are conducted on the same principle as in the animal system. The most conclusive proof that vegetables are endowed with ganglionic nerves is their power of generating heat. Sir E. Home has discovered that animal heat is not produced by every part of the nervous system, but only by the ganglionic nerves. He observes that the temperature of those animals which possess only a brain, or some part equivalent to it, never exceeds that of the medium in which they are immersed; while those whose temperature is always found greater than that of the medium which surrounds them are supplied with ganglia. The ganglionic nerves appear then to possess the specific faculty of generating heat. If then animals derive their power of creating heat from the ganglionic nerves, it is to be presumed that vegetables, which are endued with the same power, obtain it from the same source. There can be no doubt, therefore, (and it is more consistent with our ideas of the general harmony of nature to suppose,) that plants possess ganglionic nerves, and, of course, that peculiar sensation dependent on these nerves; not sensation with perception, but that state of consciousness, or pleasurable feeling, to which the name of health has been applied. The conjecture which I have advanced respecting the existence of ganglionic nerves in plants has been corroborated by the testimony of M. Brachet. This eminent physiologist, in a work entitled *Recherches Expérimentales sur les Fonctions du Système Nerveux Ganglionnaire*, &c., which was only for the first time made known in England in January last (six weeks after my paper had been read to the Hull Literary and Philosophical Society), expresses the belief that vegetables have the faculty of sensibility, and that this sensibility is derived from a ganglionic system of nerves, which, by a variety of experiments and arguments, he has satisfactorily proved they possess.

Sir J. E. Smith, too, conceived that plants are endued with sensation, although he makes no allusion to their possessing either ganglionic or any other kind of nerves. In his *Intro-*

duction to Physiological and Systematical Botany, says this elegant and learned writer, "as they (vegetables) possess life, irritability, and motion, spontaneously directing their organs to what is natural and beneficial to them, and flourishing according to their success in satisfying their wants, may not the exercise of their vital functions be attended with some degree of sensation, however low, and some consequent share of happiness? Such a supposition accords with all the best ideas we can form of the Divine Creator, nor could the consequent uneasiness which plants must suffer, no doubt in a very low degree likewise, from the depredations of animals, bear any comparison with their enjoyment on the whole."

ART. III. *Rough Notes made during a Pedestrian Tour to the Lakes of Cumberland and Westmoreland, in the Spring of* 1830. By G. and H.

(*Continued from* Vol. IV. p. 302.)

Sir,

IN forwarding you a continuation of the "Rough Notes made during a Pedestrian Tour to the Lakes," I am anxious of offering some explanation and apology to your readers for intruding into your pages papers having little of interest and less of elegance to recommend them.

They were not composed by the parlour fire, for the amusement of the public, but penned by my pedestrian friend and myself, in the little Cumberland inns, whilst surrounded by the scenery which they faintly attempt to describe, when the long march of the day or the anticipated climb of the morrow demanded some such quiet evening's amusement. Under such circumstances they were more likely to bear the stamp of truth than the polish of authorship and leisure: inclination or ability has since been wanting to dress up our crude notices for the refined taste of your critical readers.

Our object in sending them for insertion, however, is not the gratification of such, but the humble hope that other of your subscribers, blessed with an equal share of health and strength, but having, like ourselves, but little leisure and little cash, may be induced to devote them to this most enchanting tour of the north-western counties. Here they will meet with scenery surpassing the most highly coloured painting of fancy; and should they discover one new plant, or capture one new insect, we shall feel amply repaid for the trouble of transcribing, and care little for any anathema that our homeliness may draw down upon us.

Your obedient servant,

Kennington, November 15. 1831. G.

Wednesday, May 19. 1830.—Upon looking out this morning, our prospects remained clouded, and "the mighty Helvellyn" was still enveloped in impenetrable fog. We were resolved, however, to reach Ambleside to-day, and were unwilling to pursue any route except that which lay over the mountain's brow. To have accomplished it without a guide would have been next to impossible; we therefore sent for the village Vulcan, who acted in this capacity, and, upon consulting him as to the practicability of finding our way through the mist, he encouraged the attempt, and agreed to conduct us. Full of anticipation, we set out without loss of time, and having pursued the course of the stream, with the beauties of which we had been so much pleased yesterday, for about two miles, crossing it, we began our ascent by a narrow sheep-walk, the view gradually opening to our delighted eyes as we advanced, and ere we reached the ridge of mountains upon which are the bases of Striden-edge and Catchedecam (by either of which we might ascend Helvellyn) the prospect had become the most extensive we had ever seen. Having enjoyed it for a short time, we directed our course towards Striden-edge, determining to make our ascent in that direction, it being by far the most grand, though at the same time the most dangerous and difficult. Here we were very soon enveloped in thick mist, which quite obscured all distant objects from the sight, except at intervals. Continuing, however, slowly to follow our guide, amongst rocks and stones (passing round some, and over others), the footing gradually became more steep and uncertain, until, for some distance, the pass did not exceed 2 or 3 ft. in width; whilst at other times we were compelled to work ourselves along with the assistance of our hands and feet, whilst striding across this terrific wall. The appearance of the mountain was indeed at this time very grand: on our right was a slope towards the Red Tarn, of about 500 ft.; and on our left a perpendicular steep, of nearly 2000 ft., of rugged pointed rocks, bristling up in every direction, and rendered more interesting by the momentary and uncertain peeps we obtained of them between the passing clouds. After some steep climbing we arrived at the summit of our present wishes, by standing on the top of this noble mountain, of which we had in vain attempted to get a sight for the two previous days; nor did we now see it till actually climbing up it. The mist continued impenetrable, and the temperature at this elevation was extremely cold. Our time, which had it been clear would have been occupied in enjoying the views, was now put to other account, and we were glad to keep ourselves warm by turning over the loose stones which cover this mountain's top in search of insects, being unwilling to omit any favourable opportunity of capturing them. I was therefore employed to my heart's content, and took in great plenty Cárabus glabràtus and Helòbia Gyllenhàl*ii*. On arriving at the highest point we had dismissed our guide, he having first pointed out to us the direction of Keswick; and now we heard his sepulchral cries far below us, sounding through the mist, as though they came from an inhabitant of some other world, and reechoed again and again by the surrounding mountains. The clouds, which had previously bounded our horizon, now cleared away as if by magic, and opened to us here and there the most superb and distant glimpses. At one moment we could distinctly see Ulswater, all bright and sunny; at another, Thirlmere, and part of Bassenthwaite Water: this sort of enchantment lasted but for a few seconds, and the next all was again dark, cold, and gloomy as before. I was very anxious to meet with the nest and eggs of the dotterel [*Charàdrius* Morinéllus], which I was informed had been found here, but we only saw the bird as it was wheeling round us in the fog. I took, in climbing the mountain, six species of the genus *Cárabus* in abundance, namely, glabràtus, cancellàtus, horténsis, arvénsis, catenulàtus, and violàceus. We had seen all we could, and therefore began our descent towards Keswick. The ascent of the mountain, on the western side, is very easy, and gives any one but a poor idea of the grandeur of Helvellyn. We made our way in the direction of Thirlmere, and penetrating the cloud, which only capped the mountain, we were soon gladdened and warmed by the sun's rays. Thirlmere is a pretty little lake, and very narrow in the middle, where it is crossed by a bridge. Before approaching very near to it, you gain the road to Keswick; and, whilst quenching our thirst at the little "honest alehouse" at the foot of the mountain, the Lake Tourist coach passed us. This day's march was concluded by a five miles' walk to Keswick, the near approach to which is very imposing. Descending into the town, you catch a full view of Derwentwater, and its wooded banks and islands, backed by lofty mountains on your left; whilst the tamer scenery of Bassenthwaite, connected with them by a flat cultivated plain, and Skiddaw rising high over all, bound your prospect to the right. We took up our quarters in the travellers' room of the Royal Oak Inn, and having made all the toilet our knapsacks would allow, and refreshed ourselves by a plenteous potation of tea, we sallied forth to explore the town and neighbourhood. Our first enquiry was for the residence of the poet laureate, and we had pointed out to us a house exhibiting as little of taste, or of the picturesque, as you can well imagine. In passing through the street, we were annoyed by a host of idle lounging fellows, yclept guides and boat- ; a set of scoundrels, who drink all summer, and live upon the parish in the winter. Dispensing with their proffered services, we went to Hutton's Museum, more to see the man than any other curiosity; but he being, unluckily, from home, his daughter, an elderly woman, who has lived some years at St. Petersburgh, showed it to us. What principally attracted our attention was a large stuffed dog (very much resembling a wolf, and having its propensities), which some years ago spread devastation amongst the flocks of sheep in this neighbourhood: a reward was offered for its destruction, and, though hunted by men and dogs, its caution and swiftness eluded their pursuit, till it was found asleep under a hedge, and in that position shot. Our next visit was to the Lake of Derwent, where we rowed ourselves round the pretty islands which adorn its glassy bosom, and were serenaded by several herons soaring at a great height above us. [See Vol. IV. p. 279.] In Keswick the number of notices of "botanist and mineral dealers" amused us, and we went to roost highly delighted with the glorious treat which this day's walk had afforded us. H.

(*To be continued.*)

Art. IV. *Account of the Símia syndáctyla, or Ungka Ape of Sumatra; the Anatomy of its Larynx, &c. &c.* By George Bennett, Esq. F.L.S. M.R.C.S. &c. &c.

During a visit to the Island of Singapore, on the 13th of November, 1830, a male specimen of this interesting animal was presented to me by E. Boustead, Esq., a mercantile gentleman resident at that island, and who evinced a great and laudable desire of forwarding pursuits of natural history. The animal had been recently brought by a Malay lad from the Menangkabau country, in the interior of Sumatra. The Malays at Singapore called this animal the Ungka; by Sir Stamford Raffles it has been stated as being called the Siamang among the natives; and the Ungka ape is described by F. Cuvier as the Onko, in his splendid work on the Mammàlia, plates v. and vi. On making enquiry among the Malays at Singapore, they denied this animal being the Siamang, at the same time stating that the Siamang resembled it in form, but differed in having the eyebrows and hair around the face of a white colour.

The Símia syndáctyla is described and figured in Dr. Horsfield's *Zoology of Java*; but the engraving does not give a correct idea of the animal. The following sketches (*figs.* 42, 43, 44.) are taken from drawings made by Charles Landseer, Esq., from the original, which is now deposited in the British Museum.

The object of this communication is to relate the habits of the animal as observed on board the ship Sophia during the passage to England. The measurement of the animal was as follows: — From the os calcis to the vertex of the head, 2 ft. 4 in.; span of the arms, 4 ft.; length of the arm, from the axilla to the termination of the fore finger, 1 ft. 10½ in.; length of the leg, from the groin to the os calcis, 11 in.; length from the xiphoid or ensiform cartilage to the crest of the pubis, 7½ in.

The teeth are twelve in each jaw; four incisors, two canine, and six molares: in the upper jaw the canine were placed widely apart from the last incisor, giving an appearance as if a tooth was deficient: this did not occur in the lower jaw. The teeth of the animal were in very bad condition. The colour of the animal is entirely black, being covered with stiff hair of a beautiful jet black over the whole body; the face has no hair, except on the sides as whiskers, and the hair stands forward from the forehead over the eyes; there is little beard. The skin of the face is black; the arms are very long, the radius and ulna being of greater length than the os humeri; the hair on the arm runs in one direction, viz. downwards, that on the forearm upwards; the hands are long and narrow, fingers long and tapering; thumb short, not reaching farther than the first joint of the fore finger; the palms of the hands

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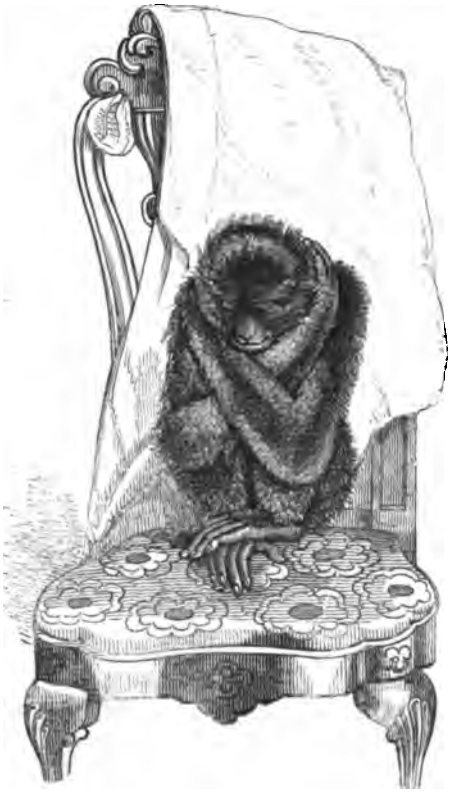

and soles of the feet are bare and black; the legs are short in proportion to the arms and body; the feet are long, prehensile, and, when the animal is in a sitting posture (*fig.* 42.), are turned inwards, and the toes are bent. The first and second toes are united (except at the last joint) by a membrane, from which circumstance he has derived his specific name. He invariably walks in the erect posture when on a level surface; and then the arms either hang down, enabling him sometimes to assist himself with his knuckles; or, what is more usual, he keeps his arms uplifted in an erect position, with the hands pendent (*fig.* 43.), ready to seize a rope and climb up on the approach of any danger, or on the obtrusion of strangers. He walks rather quick in the erect posture, but with a waddling gait, and is soon run down if whilst pursued he has no opportunity of escaping by climbing. On the foot are five toes, the great toe being placed like the thumb of the hand; the form of the foot is somewhat similar to that of the hand, having an equal prehensile power; the great toe has a capability of much extension outwards, which enlarges the surface of the foot when the animal walks; the toes are short, the great toe is the longest. The eyes of the animal are close together, with the irides of a hazel colour: the upper eyelids have lashes, the lower have none: the nose is confluent with the face, except at the nostrils, which are a little elevated; nostrils on each side, and the nose

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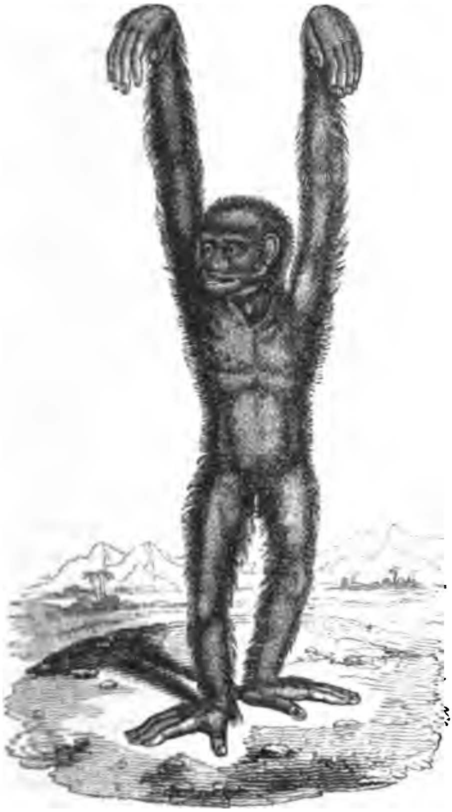

united to the upper lip: the mouth large: ears small, and resembling the human, but without the pendent lobe. He has nails on the fingers and toes; he has two hard tubercles on the tuberosities of the ischium, but is destitute of a tail or even the rudiments of one.

His food is various: he prefers vegetable diet, as rice, plantains, &c., and was ravenously fond of carrots, of which we had some quantity preserved on board. He would drink tea, coffee, and chocolate, but neither wine nor spirits: of animal food he prefers fowl to any other; but a lizard having been caught on board, and placed before him, he took it immediately in his paw, and greedily devoured it.

The first instance I observed of its attachment was soon after the animal had been presented to me by Mr. Boustead. On entering the yard in which he was tied up, one morning, I was not well pleased at observing him busily engaged in removing his belt and cord, at the same time whining and uttering a peculiar squeaking noise. When loose, he walked in the usual erect posture towards some Malays who were standing near the place; and after hugging the legs of several of the party, he went to a Malay lad, climbed upon and hugged him closely, having an expression, in both the look and manner, of gratification at being once again in the arms of him who, I now understood, was his former master. When this lad sold him to Mr. Boustead, whenever the animal could get loose he would make for the water-side, the Malay lad being usually on board the prau in which they had arrived from Sumatra; and the animal was never taken until, having reached the water, he could proceed no farther. On sending him aboard the ship (Sophia), he on arriving, after rewarding his conductor with a bite, escaped, and ascended the rigging; but towards the evening he came down on the deck, and was readily secured. We sailed from Singapore for England with him on the 18th of November.

He is not able to take up small objects with facility, on account of the disproportion of the size of the thumb to the fingers. The metacarpal bone of the thumb has the mobility of a first joint; the form of both the feet and hands gives a great prehensile power, fitted for the woods, where it must be almost impossible to capture an adult animal alive.

Under the throat is a large black pouch, a continuation of the common integument, and very thinly covered with hair: this pouch is not very visible when undistended: it is a thick integument, of a blackish colour and corrugated appearance. It extends from the under part of the chin to the throat, and is attached as low down as the upper part of the sternum, and is also attached above to the symphysis of the lower jaw:

its use is not well known, but it is not improbable that it is an appendage to the organ of voice. Sometimes, when irritated, I have observed him inflate the pouch, uttering at the same time a hollow barking noise [*]; for the production of which, the rushing of the air into the sac was an adjuvant. The inflation of the pouch was not, however, confined to anger; for, when pleased, he would purse the mouth, drive the air with an audible noise into the sac; or when yawning, it was also inflated; and in all instances he would gradually empty the sac, as if he derived a pleasure from it. When the sac has been distended, I have often pressed on it, and forced the air contained within it into the mouth, the animal not evincing at the time any sign of its being an annoyance to him. When uttering the barking noise, the pouch is not inflated to the same extent as when he yawns. It has been stated in an American publication, that the use of the air-sac is for a swimming-bladder. It may be said in refutation (if the assertion is not too absurd to be refuted) that the animal being one day washed in a large tub of water, although much frightened, did not inflate or make the least attempt to inflate the sac. He is destitute of cheek-pouches as a reservoir for food.

When sleeping, he lies along either on the side or back, resting the head on the hands, and seemed always desirous of retiring to rest at sunset; but would often (I suppose from his approximation to civilisation) indulge in bed some time after sunrise; and frequently when I awoke I have seen him lying on his back, his long arms stretched out, and, with eyes open, appearing as if buried in deep reflection. The sounds he uttered were various: when pleased at a recognition of his friends, he would utter a peculiar squeaking chirping note; when irritated, a hollow barking noise was produced; but when angry and frightened, or when chastised, the loud guttural sounds of *ra*, *ra*, *ra*, invariably followed. When I approached him for the first time in the morning, he greeted me with his chirping notes, advancing his face at the same time, as if intended for the purpose of salutation. He had a gravity of look and mildness of manner, and was deficient in those mischievous tricks so peculiar to the monkey tribe. In only one instance did I experience any mischief from him, and that was in his meddling with my inkstand: he had a *penchant* for the black fluid, would drink the ink, and suck the pens, whenever an opportunity offered of his gratifying this morbid propensity. He soon knew the name of Ungka, which had been given to him; and would readily come to those to whom he was attached when called by that name. His temper was mild, and not readily irritated; his mildness of disposition and playfulness of manner made him a universal favourite with all on board.

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[*] When the barking noise was made, the lips were pursed out, and the air driven into the sac, at the same time that the sound was uttered, the lower jaw was also a little protruded.

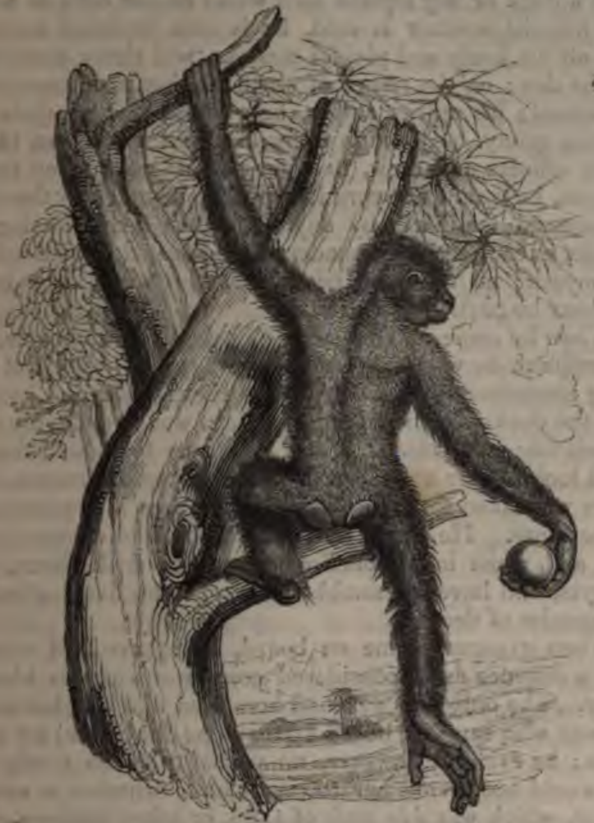
When he walks in the erect posture, he turns the leg and foot outwards, which occasions him to have a waddling gait and a bow-legged appearance. He would walk the deck, being held by his long arm, and then had a resemblance to a child just learning to walk. He has an awkward manner of drinking, by which the liquid is much wasted: he first applies his lips to the liquid, throwing the head up, which may in some degree be attributed to the prominency of the lower jaw; and if the vessel in which the liquid is contained should be shallow, he dips the paw into it, holds it over the mouth, letting the liquid drop in. I never observed him lap with the tongue when drinking; but when tea or coffee was given to him, the lingual organ was carefully protruded for the purpose of ascertaining its temperature.

He usually (on first coming on board), after taking exercise about the rigging, retired to rest at sunset, in the maintop, coming on deck at daylight. This continued until our arrival off the Cape, when, experiencing a lower temperature, he expressed an eager desire to be taken in my arms, and indulged by being permitted to pass the night in my cabin, for which he evinced such a decided partiality, that on the return of warm weather he would not retire to the maintop, but was always eager to pass the night in the cabin.

He was playful, but preferred children to adults; he became particularly attached to a little Papuan child (Elau, a native of Erromanga, one of the New Hebrides group) who was on board, and who, it is not improbable, he may have in some degree considered as having an affinity to his species. They were often seen sitting near the capstan, the animal with its long paw around her neck, lovingly eating biscuit together. She would lead him about by his long arms; and it was very amusing to see him running round the capstan pursued by or pursuing the child; he would waddle along at a rapid pace, sometimes aiding himself by his knuckles; but, when fatigued, would spring aside, seize a rope, and ascend a short distance, safe from pursuit. In a playful manner he would roll on deck with the child, displaying a mock combat, pushing with his feet (in which action he seems to possess great muscular power), entwining his arms around her, and pretending to bite; or, seizing a rope, he would swing towards her, and, when efforts were made to seize him, would elude the grasp by swinging away; or he would drop suddenly on her from the ropes aloft, and then engage in various playful antics. He would play in a similar manner with adults, but always seemed to have a preference for children. If an attempt was, however, made by the child to play with him when he had no inclination, or after he had sustained some disappointment, he usually made a slight impression with his teeth on her arm, just sufficient to act as a warning that no liberties were to be taken with his person; or as the child would say, "Ungka no like play now." Not unfrequently, a string being tied to his leg, the child would amuse herself by dragging the patient animal about the deck; tired, however, of such practical jokes, without having himself any share in the fun, he endeavoured to disengage himself and retire: on finding his efforts fruitless, he would quietly walk up to the child, make an impression with his teeth on one of the members that were the nearest, soon terminate the sport, and procure his liberty.

There were also on board the ship several small monkeys, with whom Ungka was desirous of forming interesting "conversaziones," to introduce a social character among them, to while away the tedious hours, and to dissipate the monotony of the voyage; but to this the monkeys would not accede, and they all cordially united to repel the approaches of the "little man in black," by chattering, and sundry other hostile movements peculiar to their race. Ungka, thus repelled in his endeavours to establish a social intercourse, determined to punish them for their impudence: when they again united to repel him, by chattering and divers other impudent tricks, he seized a rope, and, swinging towards the nearest, seized his "caudal appendage," and hauled away upon it, until the agility of the monkey obliged him to relinquish his hold. But it not unfrequently happened that he made his way up the rigging, dragging the monkey by the tail after him, and if he required both hands to expedite his ascent, the tail of his captive would be passed into the prehensile power of his foot. These ludicrous scenes were performed by Ungka with the most perfect gravity of countenance; having no caudal extremity himself, he knew that he was free from any retaliation. As this treatment was far from being amusing to the monkeys, they afterwards either avoided him, or made so formidable a defence on his approach, that Ungka was obliged to refrain from indulging himself in "*tale-bearing*." He had, however, such an inclination to *draw out tails*, that, being obliged from "peculiar circumstances" to relinquish those of the monkeys, he cultivated the friendship of a little pig that ran about the deck, and, taking his tail in his hand, endeavoured, by frequent pulling, to reduce it from a curled to a straight form; but all his efforts were in vain: although piggy did not express any ill-feeling at his kind endeavours. On the dinner being announced by the steward, he invariably entered the cuddy, took his station near the table, and "scraps were thankfully received." If when once at dinner he was laughed at, he vented his indignation at being made the subject of ridicule, by uttering his peculiar hollow barking noise, at the same time inflating the air sac, and regarding the persons laughing with a most serious look until they had ceased, when he would quietly resume his dinner. He disliked confinement, or being left alone; when shut up, he would display great ebullitions of temper, but would be perfectly quiet when released. At sunset when desirous of retiring to rest, he would approach his friends, uttering his peculiar chirping note, beseeching to be taken into their arms: his request once acceded to, he was as difficult to remove as Sinbad's Old Man of the Sea, any attempt to remove him being followed by violent screams; he clung still closer to the person in whose arms he was lodged, and it was difficult to remove him until he fell asleep. His tailless appearance, when the back is turned towards the spectator, and his erect posture, gives an appearance of a little black hairy man; and such an object might easily have been regarded by the superstitious as one of the imps of darkness.

The limbs, from their muscular and strong prehensile power, render the animal a fit inhabitant for the forest (*fig.* 44.); enabling him to spring from tree to tree with an agility that we have frequently witnessed him display about the rigging of the ship; passing down the backstays, sometimes hanging by his hands, at others by walking down them in the erect posture, like a rope-dancer, balancing himself by his long arms; or he would spring from one rope at a great distance to another, or would drop from one above to another below. Being aware of his inability to readily escape pursuit when running on a level surface, his first object, when about to make an attack, was to secure a rope, and swing towards the object he was desirous of attacking; if defeated, he eluded pursuit by climbing out of reach. He was very fond of sweatmeats, dates, &c.; some Manilla sweet cakes that were on board he was always eager to procure, and would not unfrequently enter the cabin in which they were kept, and endeavour to lift up the cork of the jar: he was not less fond of onions, although their acridity would cause him to sneeze and loll out his tongue; when he took one he put it in his mouth, and eat it with great rapidity. He could not endure disappointment, and, like the human species, was always better pleased when he had his own way; when refused any thing, he would display all the ebullitions of temper of a spoiled child, lie on deck, roll about, throw his arms and legs in various directions, dash every thing about that might be within his reach, walk about, repeat the same scene as before, uttering during the time the guttural notes of *ra*, *ra*: the employment of coercive measures during the paroxysms reduced him in a short period to a system of obedience, and the temper was in some degree checked. He had not an unapt resemblance to a spoiled child, who may justly be defined as papa's pride, mamma's darling, the visiter's terror, and an annoyance to all the living animals, men and maid servants, dogs, cats, &c., in the house that he may be inhabiting.



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The position of the feet, when the animal walks, is turned outwards, and the great toe, which has a capability of great extension, is spread out wide, giving a broader surface to the foot; when he walks, to use a nautical phrase, "he sways the body," and stepping at once on the whole of the under surface of the foot, occasions a pattering noise, like that which is heard when a duck or any aquatic bird walks on the deck of a ship.

When the weather is cold, he is seen huddled together, loses all his lively and playful manner, and sleeps much during the day: on the return of warm weather, it imparts life to the animal; his spirits revive, he resumes his gambols and sportive gaiety. Although every kindness was shown to him by the officers and crew, and sweetmeats were given to him by them, he would not permit himself to be taken in the arms, or caressed familiarly by any person on board during the voyage, except the commander, Mr. Hays the third officer, and myself; all those, in particular, who wore large bushy whiskers he particularly avoided.

When he came at sunset to be taken into my arms, and was refused, he would display a paroxysm of rage, but that being unsuccessful, he would mount the rigging, and hanging over the deck on which I was walking, would suddenly drop himself into my arms.* It was ludicrous to behold the terrified looks of the animal, and half-suppressed screams, if his finger was taken towards a cup of hot tea, as if to ascertain its temperature. He would frequently hang from a rope by one arm, and, when in a frolicksome humour, frisk about, shut his eyes, and have a resemblance to a person hanging and in the agonies of death.

When strangers came on board, he approached them at such a distance as he considered consistent with his ideas of safety. The only lady who had honoured him with her notice was one who came on board from a ship (Euphrates) we spoke at sea; he evinced, however, no partiality to the gentle sex, and would not permit her to caress him: whether it was the bonnet, which was *à la mode* of 1828, or other portions of the lady's dress, that excited his indignation, I know not; but he was evidently not eager to become acquainted with her: as she appeared at first timid of approaching the animal, it may in some degree have occasioned the cunning brute to keep up the feeling.†

* The account of the orang-utan given by Dr. Abel, in the *Narrative of a Journey in the Interior of China*, accords with the habits of this animal, and the comparison is very interesting.

† I was acquainted with a lady in Ceylon, who, having been bitten by a cockatoo, always evinced great terror at the approach of one which was kept in the house: the bird appeared aware of it; for, when he saw the lady approach, he would flap his wings, elevate his crest, shriek out, and at the same time pretend to pursue her, at which she ran away quite terrified.

On the 19th of March (1831) we had reached the latitude 45° 41′ N. and longitude 24° 40′ W.; the animal seemed (although clothed in flannel) to suffer much from cold, and he was attacked by dysentery: his attachment was so great, that he would prefer going on the deck, in the cold air, with the persons to whom he was attached, to remaining in the warm cabin with those whom he did not regard. On the 24th he became much worse, his appetite gone, and he had a dislike of being moved; the discharge from the bowels was bilious, mixed with blood and mucus, sometimes entirely of blood and mucus, with a putrescent odour: the breath had a sickly odour, mouth clammy, eyes dull and suffused; drank a little water occasionally, and sometimes a little tea; he generally remained with his head hanging on the breast, and limbs huddled together; he would, however, when yawning, inflate the pouch as usual. On the 29th we had prevailing easterly winds; and he was daily sinking until the 31st of March, when he died, in latitude 48° 36′ N., longitude 9° 1′ W.

On examination, the thoracic viscera were healthy; the spleen was healthy, of small size, and lobulated at one extremity; the liver was large and healthy, the difference in size between that organ and the spleen was considerable in comparison with the relative proportions of those organs in the human subject; the gall bladder contained a small quantity of dark, thick, and viscid bile; some of the mesenteric glands were enlarged, some being of a white, others of a dark colour. On laying open the duodenum, it was found to contain a quantity of mucus slightly tinged with bile; the colon and cæcum were full of liquid bilious fæces mixed with mucus, and several small ulcerated patches on the inner surface, and a dark spotted appearance at others; the rectum also contained similar fæces, but mixed with a curdy matter, and there were several large patches of ulceration on the inner coat, more particularly near the termination of the gut: the kidneys were healthy, on the right the capsula renalis was large, but none was visible on the left; the bladder was quite empty, the inner surface scarcely moist. The animal had been castrated, but the spermatic cord terminated in the scrotum in two small oval substances, rather larger than peas; the sacrum and os coccygis were similar to those parts in the human subject. The communication of the larynx was examined; the epiglottis was only indicated by a slight obtuse angular rising; the sacculi laryngis three eighths of an inch in the long diameter, one eighth in the short; their margins were well defined, continued forwards below the body of the os hyoides into a membranous sac situated internal to the external thick one. This animal has one common sac, and thus differs from the orang-utan, which has two; the lungs also differ from those in the orang-utan [*] in being subdivided on each side, the right lung having three, the left two lobes, as in the human subject.[†] The extremities of the bones of the animal were cartilaginous.

London, January, 1832.

ART. V. *Remarks on Incubation, in reference to those expressed in Professor Rennie's Edition of "Montagu's Ornithological Dictionary."* By CHARLES WATERTON, Esq.

"I most earnestly entreat my readers to weigh every fact, and rigidly scrutinise every inference." (See the Professor's "Use of System," p. xxi. in said *Dictionary*.)

THE Professor tells us, in the last Number (p. 101.) of this Magazine, that "the terns, &c." (this "&c." is very vague) "leave their eggs for whole days together." In his "Plan of Study," he informs us that the careful dabchick covers her eggs with a quantity of dry hay, mind, reader, *to keep them warm* till her return.

Now, the dabchick lays her eggs at the same time of the year that the terns lay theirs. The eggshells of the dabchick and of the tern are of the same thickness, as near as may be, and their contents are precisely of the same nature. If, then, the egg of the dabchick requires to be covered in order *to keep it warm* when the bird leaves the nest, that of the tern requires the same precautionary measure, for the same reason. Or, vice versâ, if the egg of the tern be left uncovered for whole days together, then, by a parity of argument, the egg of the dabchick might be left uncovered for whole days together. But the Professor tell us expressly, that, if the dabchick quits her eggs for a moment without covering them, their vicinity to moist plants, or to water, would certainly prove fatal to the embryo chicks.

From these two extreme statements of the Professor, first, that the terns leave their eggs uncovered for whole days together; and, secondly, that the dabchick covers her eggs with dry hay, if she leaves the nest for a moment, as their vicinity to moist plants or to water would certainly prove fatal to the embryo chicks; I come to the following conclusion, viz. that the Professor knows nothing at all about the *true reason* why the dabchick covers her eggs when she leaves the nest. Wherefore I here enter my protest against this part of the Professor's "Plan of Study,"as it cannot be of the least use to natural history. On the contrary, it will do harm. It is a mere exhalation of his own brain; a kind of "Will o' the wisp," which will lead his pupils into the swamp of error. No doubt his intentions are good; but it would be well to bear in mind "tantum ne noceas, dum vis prodesse videto."*

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[*] See Mr. Owen's dissection of the Orang-utan, in No. I. of the *Proceedings of the Zoological Society of London.*

[†] The larynx and a portion of the ulcerated intestine have been deposited in the museum of the Royal College of Surgeons in London.

I must here remark that the Professor tells us that it is in very warm weather when the terns leave their nests; still, it somehow or other so happens that during their breeding season the weather is often very raw and cold, and that there are sometimes hail-storms, and even snow.

In p. 101. the Professor asks if I mean to say that eggs, *with chicks in them*, can be left till they are "cold as any stone?" I mean to say no such thing, nor have I said any such thing. See my remarks, Vol. IV. p. 518. When I introduced "cold as any stone," I particularly alluded to the time of laying, *before* the bird begins to sit; and I asked the question, viz. if the new-laid eggs be covered with hay for the purpose of keeping them *warm*, during the absence of the bird from the nest for at least four and twenty hours. I have no need to attend to the Professor's suggestion of a thermometer and a stop-watch. He who thinks it worth while to read my remarks in Vol. IV. p. 517., on Professor Rennie's new edition of *Montagu*, will there see that I took up the pen for no other purpose but to expose the Professor's plausible, though at the same time very erroneous, theory, that the careful dabchick covers her eggs every time she leaves the nest with a quantity of dry hay, to *keep them warm* till her return.

From the dabchick's nest in the bog, the Professor conducts his pupils to a carrion crow's nest, of course on the top of a tree. He says, "The carrion crow, for example, who lines her nest with wool and rabbit's fur, always covers her eggs with a quantity of this before leaving her nest, no doubt for the same reason that the dabchick employs hay."

Where, in the name of carrion, I ask, has the Professor learned that this crow *covers* its eggs with wool and rabbit's fur? Before I enter into the demerits of this whimsical statement of the Professor, I must here inform the reader that even waterfowl, whose nests are, comparatively speaking, but loosely put together, do not take any part of the lining or inside of them to cover their eggs when they leave their nests. You may see these birds, from time to time, while on the nests, stretching out their necks, and pulling towards them little bits of grass and drifting sedges; these they place all around them, on the outer rim of the nest. They cover their eggs with these materials when they leave the nest, and not with any part of the lining.

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* "Beware of doing an injury whilst you wish to do good."

Now, if, as the Professor states, the carrion crow covers her eggs when she leaves the nest, how is she to act? Is she to fly off to the rabbit and the ram, for a fresh supply of fur and wool? Or is she to have recourse to the lining of the nest, which has been most beautifully formed and arranged with nice art before she began to lay? In this case she will be driven to the necessity of undoing part of the lining every time she leaves the nest, and on her return she must contrive to replace it before she gets upon her eggs; for, after she has once got upon them, you will see by the contour of the nest that she can do little or nothing more to the lining under her. On resuming her seat, she certainly does not push the fur and wool (our carrions here never use rabbit's fur), with which the Professor tells us she covers her eggs, to the outer edge of the nest, as the waterfowl do the bits of grass and sedges with which they cover their eggs; because, if this were the case, we should see these materials lying there when we ascend the tree. Now, I always know to a certainty that the carrion crow has forsaken her nest for ever, if I find, on mounting up to it, that any part of the lining is displaced and put on the outer rim. Some unlucky schoolboy or other enemy has been there, and either robbed it of its treasure, or done to it that by which the crow instinctively knows that it is neither safe nor profitable to return to it.

The real fact is, that the Professor's specious theory about the carrion crow covering her eggs with rabbit's fur and wool, for the same reason that the dabchick employs hay, simply comes to this, viz. that the carrion crow never covers her eggs at all, when she leaves the nest.

Last year, I had fifteen carrion crows' nests in the park; some of them, by the by, upon very high trees. In the many visits which I paid to these nests, I could never find the eggs covered, though I looked pretty sharply after them, and pretty often into them.

Here I will stop for the present, and merely observe, that one day, on looking into the new edition of *Montagu*, and casting my eye on that part of the Professor's "Plan of Study" where he [p. xvii.] remarks that " most authors occasionally indulge in fancying facts, instead of proving them by observation," I could not help thinking that this remark of his would prove a formidable weapon in the hand of any body who would wish to make a home thrust at the Professor of Natural History in King's College in the City of London.

CHARLES WATERTON.

Walton Hall, Jan. 7. 1832.

ART. VI. *Dates and Remarks relative to the Migration of the Swifts in the Year* 1831. By the Rev. W. T. BREE, M.A.

Sir,

HAPPENING to be under the necessity of making a journey last summer from this place, through London, to the Kentish coast, about the time at which the swifts take their departure, I had a favourable opportunity of noticing the appearance or non-appearance of these birds in the different parts of the country through which I passed. A plain statement of the result of my observations may, perhaps, prove acceptable to such of your readers as, like myself, take an interest in watching the migration of our *H*irúndines. The swifts appeared to have taken their departure early from this part of the country (Allesley, Warwickshire). I could only observe a single one here on the 31st of July: none had been seen by me for some days previous. I left home on the 1st of August; and, as I journeyed south-eastward, could perceive no swifts all the way till I came to Stony Stratford in Buckinghamshire (a distance of forty-one miles), where two appeared; and two more the same day, at Brickhill, one stage nearer to London. Many were to be seen at Crayford and Dartford in Kent, and near Gravesend, on the 4th of August; and in the evening of that day, I observed a very large assemblage of them sporting high in air, and uttering their "joyous scream" over the precincts of the latter town; they were to be heard again at the same place early in the morning of the 5th of August; and the same day, a few more appeared in one or two places between Gravesend and Dover. At Dover I could observe none till the 7th of August, when some five or six or more in a pack were to be seen and heard as they dashed round the ancient towers of Dover Castle, in the morning; and a few more in the evening, over the town and basin. I then lost sight of them entirely until the 14th of August; on the evening of which day, three, or perhaps more, appeared again about the castle. These, I had calculated, would have been the last I should see for the season; but, to my surprise, a pair of swifts presented themselves to my notice on the 10th of September * (none having been observed in the mean time between that day and the 14th of August), hawking about with other *Hirúndines* just before dusk (a little after six o'clock), between the Marine Parade and the town of Dover.

From the above facts, it should seem that the swifts for the most part retire from the interior parts of our island considerably earlier than they do from places near the sea-coast; for they had entirely disappeared in Warwickshire by the 1st of August or before, as well as from the parts of Northamptonshire through which I passed on that day; while they were still found in considerable force at Dartford, Gravesend, &c., on the 4th and 5th of August; and some at Dover, on the 7th and 14th of that month. The pair that I observed on the 10th of September, there can be no question, were on their passage to more southern latitudes; and, like so many other travellers, had, no doubt, very recently arrived at Dover, where they rested for the night, with a view to embark for distant climes on the following morning. For it should be remembered that not one was to be seen at Dover for the space of nearly a month previously; and I looked for them on the 11th, and several following days, in vain.

It may not be out of place here, to mention that I am informed, on the authority of Mr. Le Plastrier of Snargate Street, Dover, that some years ago he discovered a swift *alive*, among the bells in the tower of St. Mary's church at Dover, in the *winter*. I much regret that my informant was unable to state the month in which this unusual fact occurred; but he is quite sure that it was in the winter, and that the bird was a swift. I am also assured by the same intelligent observer, that he recollects many years ago a similar instance of a swift being found in the winter among the bells of Stepney church. Mr. Le Plastrier's father had the care of the church clock; and on various occasions, when he went to repair or wind it up, was in the habit of being attended by his son, then a boy, who was an eye-witness of the above fact.

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* This is the latest date at which I ever myself observed the swifts with us, save one, and that was the 15th of September, 1817, at Penzance; where and when two or three were seen under precisely similar circumstances: a few birds only, associating with the swallows and martins, observed just before dusk in the evening, on the sea-coast, remaining for one day only or part of a day, and appearing after an interval of a month or more had elapsed without a single one having been visible. (See "Table of earliest and latest appearances of *Hirúndines*," Vol. II. p. 19. note f.)

I here present you, in a tabular form, with the first and last appearances of the swallows and martins for the year 1831: —

	First seen.	Last seen.
Swallow -	April 11.* (at Allesley.)	October 17. (at Mitcham, Surrey.)
Martin -	May 6. (Do.)	October 15. (Do.)
Swift -	May 13. (Do.)	Sept. 10. (Dover.)

I had no opportunity of observing the migration of the sand martin this year.

I am, Sir, yours, &c.

Allesley Rectory, Nov. 29. 1831. W. T. BREE.

ART. VII. *The Little, or Barred, Woodpecker* (Pìcus *minor* L.). By JOHN F. M. DOVASTON, Esq. A.M., of Westfelton, near Shrewsbury.

Sir,

AFTER all that has been so perspicuously said in the very able and admirable review of *The British Naturalist* in your last Number, about this surprising and minute bird (p. 63.), I have yet a few remarks to add: particularly as I observe that authors collect the scattered scraps sprinkled throughout *our* Magazine, to further the augmentation of their respective histories; which shows the great utility of these short communications from divers places. This bird is a very frequent, but uncertain, visiter to the woods around my residence here; but never fails in April to astonish me with his prodigiously loud churr on the ranpikes of trees; which, the atmosphere being favourable, may be heard more than a mile. White elegantly observes, that "where-ever there is love, there is music." Now, if this, as the judicious reviewer opines, be a "love-note" (and many insects use similar amatory serenades), the bird has a taste consonant to that of the magnanimous and delicate Bully Bottom, who averreth that he has "a reasonable good ear for music," when he preferred "the tongs and the bones" to the seraphine harmonies of the Fairy Queen and her elves. It much resembles the snorting of a frightened horse, but louder and longer. I have, indeed, occasionally heard this churring in autumn; but very infrequent, and far feebler nor does this militate against its being a signal of love; as Nature often, with a fading though sunny smile, flings many a vernal glance and expression into the serene features of Autumn. My friend Bowman long ago suggested this was a love-note, as our conversations were startfully interrupted by it, amid the forest-like woods of Erddig, near his residence at the Court. The acute and accurate Ray, with his amiable integrity, doubted the mode of its performance, by his repetition of the word *vel* (either). His emphatic words are well worth quoting — "Avis hæc, vel rostro suo in rimam arboris inserto et celerrimè huc et illuc agitato, vel creberrimâ percussione, sonum efficit crepitantem clarum, qui è longinquo exaudiri potest." * Now, I can assure your readers, from the closest observation, that the bird does not slurr his beak round a hole or fissure; but, with inconceivably rapid percussion, vibrates it against the tree. The motion is so quick as to be invisible, and the head appears in two places at once; like that of the ivory ball on the end of a long and very elastic whalebone, used for the playing on the pretty instrument of unequal bars called the staccato: and it is surprising, and to me wondrously pleasing, to observe the many varieties of tone and pitch in their loud churring, as they change their place on boughs of different vibration; as though they struck on the several bars of a gigantic staccato. When actually boring they make no noise whatever, but quiet and silently pick out the pieces of decaying wood; which, lying white and scattered beneath on the ground and plants, leads the eye up to their operations above. They have several favourite spots, to which they very frequently return. Their voice is a very feeble squeak, repeated rapidly, six or eight times, *ee ee ee ee ee*. They bore numerous and very deep holes in decayed parts, where they retire to sleep early in the evening; and, though frequently aroused, will freely return. Whatever be the purpose of this enormous noise, they certainly do very nimbly watch, and eagerly pick up, the insects they have disturbed by it. The white bars on the back are very beautiful. They fly in jerks like their congeners; always alight on the side of a tree; and the cock has a very rich crimson spot on his head. Your ingenious correspondent, the Rev. W. T. Bree, with his never-failing felicity, calls him the pump-borer. (Vol. I. p. 301.) Indeed, the communications of this gentleman, on whatever subject, display such versatility of knowledge and elegance of taste, that they always elicit the most cordial admiration of,

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* The dates above recorded relate only to what fell under my own observation. Swallows, I am told, were seen by others at Allesley on the 10th of April. I am informed also, by an attentive observer of these birds, that he saw three martins [sand martins ?], late in the evening, flying over the reservoir near Daventry, on the 23d of March; and one swift at Leamington, on the evening of the 1st of May; and also that two swallows were seen near Coventry so late as the 28th of October. I may state, too, that my friend the Rev. Thomas Whately of Cookham, in Berkshire, informs me, that, in the year 1830, he saw swallows (*Hirúndo rústica*) in that neighbourhood, on the 22d of March; and this year (1831), on the 8th of April.

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* "This bird produces a clear clattering sound, which may be heard a great way off, *either* by its beak inserted into the chink of a tree, and most rapidly agitated to and fro, *or* by excessive thickly-close percussion." (*Ray's Synopsis Avium*, p. 43. 8vo, 1713.)

Sir, yours, &c.

Westfelton, near Shrewsbury, John F. M. Dovaston.
January 21. 1832.

Art. VIII. *On the Claim of certain Lepidopterous Insects taken in England to be considered as indigenous.* By W. A. B.

That most interesting branch of natural history relating to the geographical distribution of organised existence, is making that progress towards perfection which the daily discovery of new forms, and the most accurate discrimination of specific characters, can alone effect. In this, as in all other departments of science, till settled down on the firm and immutable basis of evident truth, we may allow ourselves the aid of theory as of a scaffolding to assist in the erection of a pile which is to endure for ever; cautious, at the same time, how we argue upon facts stubbornly at variance with our preconceived ideas; resistance to which may close our eyes to conviction, that might eventually have burst upon our view with the clearness of noonday.

The observations of our distinguished countryman, Mr. Stephens, in his admirable *Illustrations of British Entomology*, on *Sphìnx* Carolìna, quinquemaculàta, Drurǽi, and some other American lepidopterous insects that have been captured at large in England, have occasioned the following strictures upon what appears to me very inconclusive reasoning against their right to rank as indigenous productions of this " our favoured isle." In venturing these my opinions, in opposition to so great an authority, I am actuated by no wish to dogmatise, but, by challenging enquiry by others, to clear up what I am incompetent singly to decide.

Mr. Stephens seems to consider it as an established principle, that a species predominant in one quarter of the globe cannot with propriety be looked upon as aboriginal when found at large in another, although the frequency of its occurrence might otherwise sanction the opinion of its being indigenous. His views of natural distribution appear on this point as limited as are the boundaries of land and water, within which he would confine the species to whom he denies the rights of citizenship, on the plea of their being interlopers escaped from a foreign land. He puts out of the question the important influence of temperature, and the numerous aberrations of Nature from her own general laws; deviations so numerous, as generally to leave our most specious theories terribly at fault.

A man of such extensive information on all subjects connected with natural science as Mr. Stephens, must, no doubt, be aware that vegetable and animal forms of specific identity are often produced in very distant regions, to the exclusion of those immediately contiguous or intervening; in which case, be it obsérved, there is for the most part a decided correspondence, or at least approximation, in temperature, soil, elevation, or other requisite condition, between the two countries. Circæ'*a* lutetiàna is found in the moist valleys of Nepaul*, as in our own climate: many of our plants are truly indigenous to the northern parts of America. Wahlenberg remarks, in *Flòra Suécica*, upon *V*eràtrum álbum, that it occurs copiously on the alpine ridges of Norway and Switzerland, while we may search in vain for the same plant in any intermediate locality. To confine ourselves to our legitimate class for an illustration, our own beautiful Cýnthi*a* cárdui is found without a varying mark, according to Latreille, not only at the Cape, but in New Holland, "though oceans roll between;" this common insect being fitted to exist under very different ranges of temperature. In the same way is Vanéss*a* Antìop*a* distributed over all Europe and a great part of the northern continent of America.

It may be objected to us, perhaps, when advocating the claims of *S*phìn*x* Carolìna, quinquemaculàta, Drur*æ*'*i*, &c., to a place in our indigenous catalogues, that the instances of their capture in this country are too "few and far between" to warrant the concession of such a privilege; that their appearance is of modern date, no mention of them being made by the older entomologists, nor any instance of their capture recorded prior to the middle of the last century.

To this we answer, that paucity of number cannot be urged as an objection, without implicating many insects of indisputable British origin in the general suspicion of extraneous descent. As far as we have had an opportunity of learning, a multitude of our finest insects, amongst which may be enumerated Deiléphila lineàta, euphórbiæ, and gàlii, though pretty widely distributed, were not dreamed of by the old collectors as natives of our own territory; and, if we mistake not, many of those scarcely included *inter rariores* at the present day, e. g. *P*apilio Machào*n*, Vanéss*a* Antìop*a*, &c. were hardly known before the time of Petiver, when the votaries of entomology became more numerous. It was reserved for the piercing scrutiny of a more scientific era; for the indefatigable researches of a Stephens, a Leach, a Curtis, and a Dale, to draw the highly interesting species that now enrich and adorn our cabinets, as Eulèpia gramínea, Lycæ`n*a* díspar, Læ`li*a* cænòsa, with a host of others, from an obscurity as complete as if they were utter strangers in the land. Yet no one, I presume, will venture to arraign their title to adoption, were it only that the greater part, if not all of them, are known to belong to strictly European species.

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* In Smith's *English Flora*, vol. i. p. 210., is this remark on *G*àlium *A*parìne: — "This common European plant has been found wild in the remote country of Nepaul by the Hon. Captain Gardner, from whom Dr. Wallich has sent us specimens." — *J. D.*

If frequency of occurrence is to be thrown into the scale in favour of Mr. Stephens's hypothesis, then may *S*phín*x* Carolìna or quinquemaculàta boldly await the issue of the decision, opposed to Deiléphila lineàta or *S*phín*x* pinástri, since it appears that the former, or one of the two (if really distinct), has at least been taken alive in this country nearly or quite as often as the last-mentioned insect; which remark may likewise be extended to species belonging to different genera, of infinitely greater rarity, but indubitably British, as Catocàla fráxini, Còlia*s* Chrysóthem*e*, &c.

Let us examine the validity of Mr. Stephens's objections grounded on a note appended to his remarks upon Deiléphila Celèri*o*, in his excellent *Illustrations of Entomology**, wherein he mentions the capture of nearly fifty species of exotic insects in the West India Docks, and among the rest three of the huge *M*ygàle Aviculària. Then follows an observation upon the extraneous origin of the *B*láttæ, so common in the houses not only of the metropolis but also in those of most of our seaport towns, which we think few will venture to controvert. The note then concludes with an enumeration of several exotic coleopterous insects, and one of the Orthóptera, found at large in this country. It remains to be seen what so formidable a cloud of insect evidence can achieve.

Mr. Stephens has not favoured us with an account of to what orders, natural or artificial, the insects belonged, stated to have been caught in the West India Docks; but, from the enumeration of such as he has himself detected, it may be inferred they were mostly of the beetle tribe, and wood-borers in their larva state. Can any thing be more apparent than that the insects in question were imported along with foreign wood, in which the larvæ or pupæ were embedded till the appointed time for their disclosure arrived; or the imago itself might have taken up its abode in some crevice, and so be conveyed across the Atlantic, endued as insects of this class are with astonishing powers of abstinence. *Mygàle* Aviculària has frequently been taken in other parts of Europe, generally we believe amongst piles of wood; but knowing as we do the habits of the *A*ráchnidæ, their propensity to concealment, and their capability of resisting a long privation of food, our wonder may cease at occasionally finding them at large in less genial climates than their own. The appearance of the Chinese Conocéphalus is at once accounted for by supposing its accidental introduction into one of the Company's tea boxes; and surely, amidst such abundant good cheer, passage free, and a secure berth, what earthly reason could there be for his feeling *mal à son aise*, and not arriving safe and sound? Of these Mr. Stephens may truly say, without danger of contradiction, " Vix ea nostra voco." [" I can scarcely call them ours."]

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* Haustellata, vol. i. p. 129. infra.

Not so, however, I apprehend, of our outlawed Sphínges, whose appearance it would puzzle a divine to account for on the above principle. We have here to deal with a class of insects of great size, and comparatively delicate organisation; their larvæ, bulky, and conspicuous from the variety and beauty of their colouring, are ill fitted to escape observation, and seek retirement in holes and corners, few of which could be found ample enough to conceal them effectually, did their habits incline them to do so otherwise than by availing themselves of the partial shelter of some leaf; their transformations into pupæ are conducted below the surface of the earth, the only condition under which animals of this extensive order can exist for any length of time without taking nourishment. With so many impediments to their accidental transport, by what means can we conceive their introduction to have been accomplished, presuming it always to have been a fortuitous one? We have demonstrated the difficulty as it regards the larva, the necessary pabulum for which is not to be looked for amongst the ship's stores; the subterraneous habits of the pupa are not less formidable obstacles; and the imago, it may be confidently asserted, could not sustain a voyage across the Atlantic without the requisite supply of its nectareous food. To conjecture that the eggs may have been attached to some piece of wood or other matter by the parent moth, which pieces of wood may have been afterwards conveyed on board, and the ova hatched in another hemisphere, is a gratuitous assumption, unwarranted by experience of natural habits, not to mention the extreme improbability of the larva being felicitously landed, and placed, just at the moment of its birth, in the enviable neighbourhood of a potato field or a plant of tobacco.

I must confess there is one avenue by which our insects may have gained a footing in this country which it would be uncandid not to avow, it being the only plausible mode of accounting for their adventitious dissemination. One may conceive it possible for the pupæ to been have dug up by chance, and conveyed in the mould employed to preserve the germinating faculties of many North American trees and shrubs whose seeds require such treatment; or in the bog earth [heath mould] sometimes brought over in ballast by our vessels, for the use of the nurserymen. But the fact that these supposed strangers have so often made their appearance, and that too sometimes in pairs, unaccompanied, as far as I know, by other North American species likely to have made themselves simultaneously visible, if such were their origin, renders the above supposition extremely hypothetical. We concede, also, the possibility of several extra-European specimens that have once or twice solitarily occurred owing their introduction to the zeal of insect disseminators; but we cannot persuade ourselves to ascribe a similar origin to such as have repeatedly been captured, and that sometimes in pairs and in the larva state.

Speaking of *Sphínx* Carolìna, Mr. Stephens says: — "The simple fact of Mr. Atkinson's specimen having been reared from the larva is not indicative of the native origin of the species." Surely this is flying in the face of the strongest evidence that can be adduced in favour of our insect clients.

We have shown the almost physical impossibility of their introduction as larvæ, and we know that the major part at least of the Sphíng*idæ* will not breed in confinement *: to what then can we ascribe the discovery of the caterpillar at large, if not to the spontaneous union of the species in a climate favourable to their propagation? It cannot have escaped the observation of those who have attentively considered the subject in reference to the soundness of Mr. Stephens's views, that the recorded instances of the capture of *S*phínx Carolìna, Drur*æ*'*i*, and quinquemaculàta, with others of the same genus, have occurred in parts of the kingdom least favourable to the idea of their American importation; at Leeds, London, Sunderland, Isle of Wight, &c., places on the southern and eastern parts of our island, inland as well as on the coast, and very remote from ports the most frequented by ships from the New World, as Bristol or Liverpool, in whose neighbourhood no examples of their discovery have hitherto been cited. It may be remarked, *en passant*, that the soil of Great Britain is particularly rich in the family of the *S*phín*gidæ*, as, with the exception of Deiléphila ? nèrii, Deiléphila *V*espertílio, Hippóphae, and Smerínthus quércus, we possess (unless greatly mistaken) all the other European species of this charming group.

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* This is too frequently the case with the larger Lepidóptera. Two years ago I kept, at my lodgings in Paris, nearly twenty-five living specimens of Sát. pỳri, obtained from larvæ found on elms, &c., around that capital the preceding year; and though the males were very active, especially at night, and had the full range of the apartment, I could never accomplish my purpóse of obtaining a stock of fertile eggs from the numerous females associated with them.

As a proof of fallacy on my side, it may be said, if the insects in question are truly indigenous, then should indigenous plants be their common source of nutriment; whereas it is distinctly stated by Abbot, and other authors, that the larva of *S*phínx Drur*æ*'*i* feeds on the *C*onvólvulus *Battàtas*; that of *S*phínx quinquemaculàta and Carolìna on the potato, tobacco, and Jamestown weed, which latter is, I believe, the *Datùra* Stramònium, now a naturalised plant in England, and which I have seen growing in very sequestered places, most abundantly, along with another American (*Œ*nothèra biénnis), in the forest of Fontainebleau and also in Hungary. With as much propriety may the title of our insect to American origin be questioned, since, with the single exception of the Jamestown weed, all the other plants asserted to serve as their usual food are foreign to the United States; but the objection is at best a very feeble one, when it is considered that many Lepidóptera in our own country are rarely found as larvæ upon any other than foreign plants which adorn our gardens, or minister to our necessities. Thus Acheróntia A'tropos is seldom found but feeding on the potato or the white jasmine (*J*asmìnum officinàle), though we know the elder and the bitter-sweet (*S*olànum Dulcamàra) to be its proper food in this country, if not equally grateful with the first. Again, *S*phínx ligústri, a strictly European species, is as often found on the lilac as on privet; and Deiléphila ? nèrii is met with occasionally in all the temperate countries of Europe, except our own island, feeding constantly on that tender green-house shrub the *N*èrium Oleánder, nor is it known to betray a partiality for any other food; and yet, from its not unfrequent appearance in the north of Germany in particular years, as well as in other parts of the Continent, where that beautiful plant requires careful protection from the severity of the winters, it is to be presumed this magnificent moth has some more abundant pabulum to resort to as a *derniere ressource,* when compelled to forage in its native haunts, perhaps the *Vinca* màjor, minor, or some species of Cynánchum, all belonging to the same natural family of *Apocýneæ.* Few polyphagous larvæ are restricted to one natural family of plants for subsistence; but, were that the case, the soil might furnish an acceptable treat to the subjects of the present dissertation in our two indigenous *Sol*àna, our henbane, deadly nightshade, *V*erbáscum, or naturalised thorn-apple, while *Sphinx* Dru*ræ'i* would probably feel quite at home making a meal on our gracefully twining birdweeds.

To infer the exotic origin of any insect merely from the foreign growth of the plant it feeds on, is an argument much on a par with one that should go to prove the present inhabitants of Wales unconnected by descent with the ancient Britons, simply because they no longer subsist like their ancestors on the spontaneous productions of their woods and forests.

Having thus endeavoured to solve the enigmas which these monsters of the insect race, like their prototype of old, have propounded to modern Œdipi, I shall conclude this dissertation with a short summary of my ideas respecting the propriety or impropriety of admitting into our lists of indigenous insects such as are recognised as inhabitants of other and distant regions. We may do this, it appears to me, without risk of confusion, —

1. When an insect is known to inhabit countries pretty similar in climate, and having nearly the same mean temperature with that in which it has been found at large, as is the case with the southern part of Great Britain and the middle portion of the United States; though the average of each season, taken separately, differs widely in the old and new continent.

2. When the same insect has been repeatedly taken in distant localities; sometimes in pairs, and especially when it has appeared in the larva state.

3. When the appearance of such insect cannot be accounted for, except in a manner very problematical and unsatisfactory.

On the other hand, we must regard such insects with suspicion as —

1. Have only once or twice been taken, as solitary specimens, in situations favourable to the idea of their importation.

2. When known to belong to exclusively tropical genera or species; occurring only on particular spots, and with habits permitting their transportation from distant climates.

We have extended the above remarks much beyond what the nature of the subject may appear to deserve; but the study of animal geography, if we may so term it, involves so many curious and important considerations, which must be reasoned upon ere they can be understood, that any attempt to elicit truth may, we hope, plead in extenuation for our want of brevity.

Clifton, Aug. 21. 1831. W. A. B.

ART. IX. *The Characters of the European Díptera, from Meigen's "Systematische Beschreibung."* Translated by GEORGE WAILES, Esq.

Sir,

AFTER the high encomiums bestowed upon Meigen's *Systematische Beschreibung der bekannten Europaïschen Zweiflugeligen Inseckten*, or Systematic Description of the known Dipterous Insects of Europe, in the *Zoological Journal*, and the anticipation therein expressed, that, with the assistance afforded by that work, the Díptera will form a favourite study of the British entomologist, your inserting the synopsis of the family and generic characters prefixed to the above publication, in an English dress, will, I trust, prove acceptable to the young entomologists of this country, and tend to call their attention to that interesting but hitherto neglected order of insects. I am, Sir, yours, &c.

GEORGE WAILES.

Newcastle on Tyne, June, 1829.

DI'PTERA.

Wings 2. *Halteres* 2, placed behind the wings.

Division I. PROBOSCI'DEÆ.

Proboscis terminating in a fleshy *labium*, and with the *haustellum* covered by a horny *labrum*; in front of the same are 2 articulated *palpi*.

A. *Antennæ with numerous Joints.*

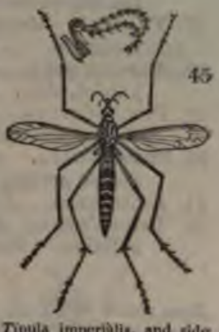
Fam. I. TIPULA'RIÆ. (*fig.* 45.)

Antennæ porrect, or directed forwards, having 6 or more distinct joints. *Palpi* exserted (fixed externally), articulated. *Halteres* naked. *Abdomen* with 7 or 8 segments.

a. Culicifo'rmes.

Eyes lunate. *Ocelli* wanting. *Antennæ* of the males plumose, of the females pubescent. *Mouth* not elongated. *Palpi* 5-jointed. *Thorax* without a transverse suture. *Abdomen* with 8 segments.

* *Proboscis* porrect, longer than the antennæ; *Palpi* straight; *Wings* with the nervures and margin squamose.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Tipula imperialis, and side view of the head.

Genus

1. Cu'lex. *Palpi* of the males longer than the antennæ, of the females very short.
2. Ano'pheles. *Palpi* of both sexes longer than the antennæ.
3. Ae'des. *Palpi* of both sexes shorter than the antennæ.

** *Proboscis* shorter than the antennæ; *Palpi* incurved.

4. Core'thra. *Wings* with the margins squamose, the nervures hairy.
5. Chiro'nomus. *Antennæ* of the males 13-jointed, of the females 6-jointed.
6. Ta'nypus. *Antennæ* 14-jointed, of the females with apex incrassate.
7. Ceratopo'gon. *Antennæ* 13-jointed, the last five joints elongated. *Legs* all equal.
8. Macro'peza. *Antennæ* 13-jointed, the last 5 joints elongated. *Hind-legs* very long.

b. Galli'colæ.

Eyes lunate. *Antennæ* verticillate, or furnished with circles of hairs. *Palpi* incurved. *Wings* villose, obtuse, with 2 or 3 longitudinal nervures. *Tibiæ* ecalcarate (without a spine).

9. Lasio'ptera. *Wings* with 2 longitudinal nervures. *Ocelli* wanting.
10. Cecidomy'ia. *Wings* with 3 longitudinal nervures. *Ocelli* wanting.
11. Campylomy'za. *Ocelli* 3.

c. Noctuæfo'rmes.

Eyes lunate. *Ocelli* wanting. *Antennæ* moniliform, or like a row of beads, verticillate. *Wings* broad, villose, with many longitudinal but no transverse nervures. *Tibiæ* ecalcarate.

12. Psycho'da.

d. Rostra'tæ.

Eyes roundish, divided above by the frons (or forehead). *Ocelli* wanting. *Head* produced into a rostrum. *Palpi* incurved. *Thorax* with an arcuate transverse suture in the middle. *Abdomen* with 8 segments. *Tibiæ* rather more calcarate.

13. Erio'ptera. *Wings*, nervures villose. *Intermediate pair of legs* shortened.
14. Limno'bia. *Wings*, nervures naked. *Antennæ* from 15 to 17-jointed, simple. *Palpi*, joints equal.
15. Rhipi'dia. *Antennæ* 14-jointed; joints globose, remote; of the male bipectinate (twice branched, like the teeth of a comb).

16. **Cteno'phora.** *Antennæ* 13-jointed, of the male duplicato-pectinate (doubly-pectinate). *Wings* shining.
17. **Ti'pula.**† *Antennæ* 13-jointed, alike in both sexes. *Palpi*, last joint elongated.
18. **Nephro'toma.** *Antennæ* of the male 19-jointed, of the female 15-jointed, alike. *Palpi*, last joint elongated.
19. **Ptycho'ptera.** *Antennæ* 16-jointed. *Palpi*, last joint elongated. *Wings*, posterior margin plicate (plaited).
20. **Nemato'cera.** *Antennæ* 6-jointed; joints of the clavola (or club-shaped portion) equal.
21. **Aniso'mera.** *Antennæ* 6-jointed; basal joint of clavola very long.
22. **Tricho'cera.** *Antennæ* setiform; 2 basal joints thick, remainder very indistinct. *Palpi* 5-jointed.

e. FUNGI'COLÆ.

Eyes round or oblong, divided above by the frons. *Ocelli* unequal, large, or apparently wanting. *Palpi* incurved, 4-jointed. *Thorax* without a transverse suture. *Abdomen* with 7 segments. *Coxæ* long. *Tibiæ* calcarate (or furnished with a spine).

* *Antennæ* setiform, for the most part with indistinct joints, the two basal ones incrassate.

23. **Di'xa.** *Ocelli* wanting.
24. **Bolito'phila.** *Ocelli* 3, in a line.
25. **Macro'cera.** *Ocelli* 3, in a triangle.

** *Antennæ* compressed, 16-jointed.

26. **Sy'napha.** *Eyes* round. *Ocelli* 3, in a line. *Tibiæ* sides unarmed.
27. **Myceto'bia.** *Eyes* reniform. *Ocelli* 3, approximate in a triangle.
28. **Platyu'ra.** *Eyes* very round. *Ocelli* 3, approximate, in a triangle. *Abdomen*, apex depressed, enlarged. *Tibiæ* unarmed (without spines).
29. **Gnori'ste.** *Proboscis* elongated. *Ocelli* 3, in a triangle. *Tibiæ*, sides spinose.
30. **Scio'phila.** *Ocelli* approximate, in a triangle. *Tibiæ*, sides spinose. *Wings* with a small intermediate, subquadrate, nearly square cell.
31. **Lei'a.** *Ocelli* 3. *Tibiæ*, sides spinose. *Wings* without a small intermediate cell.
32. **Myceto'phila.** *Ocelli* only 2, distinct, placed at the margin of the eyes. *Tibiæ*, sides spinose.
33. **Co'rdyla.** *Ocelli* wanting. *Tibiæ*, sides unarmed.

f. LU'GUBRI.

Eyes nearly confluent (joined together), deeply emarginate (notched). *Ocelli* unequal. *Antennæ* cylindric. *Palpi* 3-jointed. *Thorax* without a transverse suture. *Abdomen* with 7 segments.

34. **Sci'ara.**

g. LATIPE'NNES.

Eyes (red) of the males confluent, of the females distant, reniform. *Ocelli* wanting. *Antennæ* cylindric. *Palpi* 4-jointed. *Proboscis* porrect, perpendicular. *Abdomen* with 8 segments. *Wings* very broad.

35. **Simu'lia.**

h. MUSCÆFO'RMES.

Eyes (black) of the males confluent, of the females distant, roundish.

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† Mr. Curtis's genus Dolichópeza, which may be characterised as having the antennæ 12-jointed alike in both sexes, and palpi with the last joint elongate, is by him considered as connecting Limnòbia and Típula. (*Curtis's British Entomology*, vol. ii. pl. 62.)

Ocelli 3, equal in size. *Antennæ* cylindric. *Thorax* without a transverse suture at the middle.

36. Scato′pse. *Antennæ* 11-jointed. *Eyes* lunate.
37. Penthe′tria. *Antennæ* 11-jointed. *Eyes* oval. *Legs* unarmed.
38. Di′lophus. *Antennæ* 11-jointed. *Fore-tibia* with the apex radiated.
39. *Bi′bio.* *Antennæ* 9-jointed.
40. Aspi′stes. *Antennæ* 8-jointed, the apex clavate.
41. Rhy`phus. *Antennæ* 16-jointed.

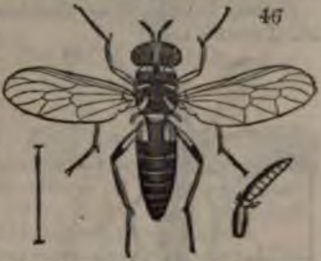
B. *Antennæ with few Joints.*

Fam. II. XYLO′PHAGI. (*fig.* 46.)

Antennæ porrect, approximating at the base, triarticulate; third joint 8-ringed. *Proboscis* retracted (drawn into the head), only the labella exserted. *Ocelli* 3. *Abdomen* with 8 segments. *Halteres* naked. *Wings* parallel, incumbent (lying on the back). *Onychii* 3.†

42. Be`ris. *Scutellum* multiradiate.
43. Xylo′phagus. *Scutellum* unarmed.
44. Cœnomy`ia. *Scutellum* bidentate.

46

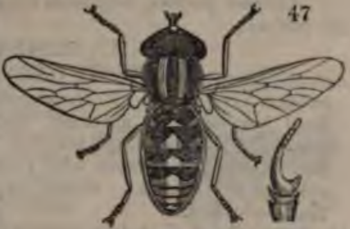


Xylóphagus maculàtus, with the antenna of X. àter.

Fam. III. TABA`NII. (*fig.* 47.)

Antennæ porrect, approximating at the base; either 3-jointed, with the third joint from 4 to 8-ringed, or 6-jointed. *Proboscis* and *palpi* exserted. *Abdomen* with 7 segments. *Halteres* sub-concealed. *Wings* divaricate (spreading), or deflexed (turned downwards). *Onychii* 3.

47



Tabànus taurìnus.

a. Antennæ 3-jointed.

45. Pango`nia. *Antennæ*, third joint 8-ringed. *Ocelli* 3. *Proboscis* exserted, elongated.
46. Si′lvius. *Antennæ*, basal joint cylindric, second cyathiform, third 5-ringed. *Ocelli* 3.
47. *Taba`nus.* *Antennæ*, third joint 5-ringed, the upper side excised (or notched) at the base. *Ocelli* wanting.
48. Chry`sops. *Antennæ*, 2 basal joints cylindric, equal, third 5-ringed. *Ocelli* 3.
49. Hæmato′pota. *Antennæ*, third joint 4-ringed. *Ocelli* wanting.

b. Antennæ 6-jointed.

50. Hexa′toma.

Fam. IV. LE′PTIDES. (*fig.* 48.)

Antennæ porrect, approximating at the base, triarticulate, third joint not ringed. *Proboscis* and *Palpi* exserted. *Ocelli* 3. *Abdomen* with 7 segments. *Halteres* naked. *Onychii* 3.

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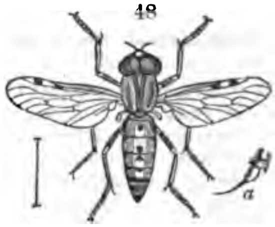
† This term is used by Meigen to designate those pulvilli of Kirby and Spence, which are situated between the unguiculi. (See *fig.* 57. *a.*)

51. **Le′ptis.** *Antennæ*, third joint conic, with an apical seta (see *fig.* 49. *a*). *Ocelli* 3, vertical.

52. **A′therix.** *Antennæ*, third joint ovate, with a dorsal seta.

53. **Clino′cera.** *Antennæ*, third joint conic, with an apical seta. *Ocelli* 3, frontal.

48



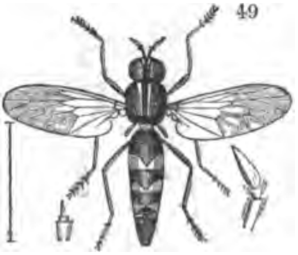
Léptis distígma (male).

Fam. V. XYLO′TOMÆ. (*fig.* 49.)

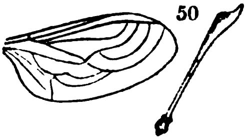
Antennæ porrect, approximating at the base, triarticulate; third joint not ringed. *Proboscis* retracted. *Ocelli* 3. *Abdomen* with 7 segments, conic. *Halteres* naked. *Wings* divaricate. *Onychii* 2.

54. **There‵va.**

49



50



Mýdas lusitánicus.

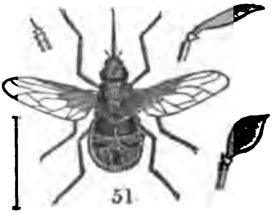
Fam. VI. MYDA‵SII. (*fig.* 50.)

Antennæ porrect, 5-jointed, the joints dissimilar, the last clavate.

55. **My‵das.**

Fam. VII. BOMBYLIA‵RII. (*fig.* 51.)

Antennæ porrect, triarticulate, third joint not ringed. *Hypostoma* (" The region of the head between the antennæ, eyes, and mouth." *Meigen*), not bearded. *Frons* flat. *Ocelli* 3. *Abdomen* with 7 segments, cylindric or elliptic. *Wings* expanded. *Halteres* naked.



51

Bombýlius cruciátus (male).

56. **Hirmoneu‵ra.** *Antennæ*, joints globose, third with a long terminal style. *Ocelli*, frontal one remote from the other two. *Proboscis* concealed.

57. **Falle‵nia.** *Antennæ*, joints globose, third with a long terminal style. *Proboscis* elongate, bent under the body.

58. **Sty′gia.** *Antennæ* contiguous, basal joint with the apex dilated, third with a terminal style. *Proboscis* concealed.

59. **A′nthrax.** *Antennæ* distant, basal joint cylindric. *Proboscis* retracted or sub-exserted. *Eyes* reniform.

60. **Mu‵lio.** *Antennæ* distant. *Proboscis* exserted, horizontal, as long as the head. *Eyes* elliptic.

61. **Bomby′lius.** *Antennæ* contiguous, third joint compressed. *Proboscis* exserted, horizontal, longer than head. *Body* woolly. *Abdomen* ovate.

62. **Phthi′ria.** *Antennæ* contiguous; third joint fusiform, compressed. *Proboscis* exserted, horizontal, longer than the head. *Body* downy. *Abdomen* cylindric or flat.

63. **Ge‵ron.** *Antennæ* contiguous; third joint subulate (or awl-shaped). *Proboscis* exserted, horizontal, longer than the head.

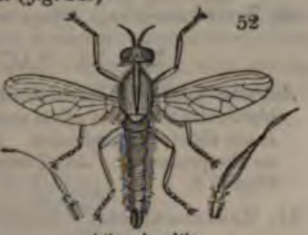
64 **U‵sia.** *Antennæ* contiguous; third joint fusiform, obtuse. *Proboscis* exserted, horizontal. *Body* villose.

65. PLO`AS. *Antennæ* contiguous, basal joint very thick, conic. *Proboscis* exserted, horizontal, as long as the head.

66. CYLLE`NIA. *Antennæ* contiguous, basal joint cylindric, third conic. *Proboscis* exserted, horizontal, as long as the head.

67. TOXO'PHORA. *Antennæ* contiguous, cylindric, third joint short, acute. *Proboscis* exserted, bent upwards.

Fam. VIII. ASI'LICI. (*fig.* 52.)


52

Asilus chrysitis.

Antennæ porrect, approximating at the base, turned upwards, triarticulate, third joint not ringed. *Hypostoma* with a mystax ("a semicircle of bristles or hairs above the mouth." *Meigen.*). *Frons* impressed. *Proboscis* horizontal, porrect, short. *Abdomen* with 7 segments. *Halteres* naked. *Wings* parallel, incumbent.

a. Tarsi with 2 Onychii.

68. DIO'CTRIA. *Antennæ*, third joint having an obtuse biarticulate apical style or bristle. *Hind tibiæ* straight, ciliated on the internal side.

69. DASYPO`GON. *Antennæ*, third joint having a short acute apical style. *Tibiæ* straight, not ciliated. *Arms* of the females spinulose.

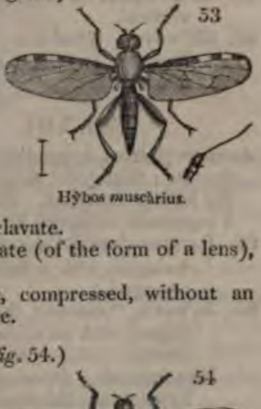
70. LA`PHRIA. *Antennæ*, third joint obtuse, without an apical style. *Tibiæ* arcuate.

71. ASI`LUS. *Antennæ*, third joint having a naked elongate setiform apical style. *Tibiæ* straight, spinulose.

b. Tarsi with no Onychii.

72. LEPTOGA'STER.

Fam. IX. HYBO'TINÆ. (*fig.* 53.)


53

Hybos muscarius.

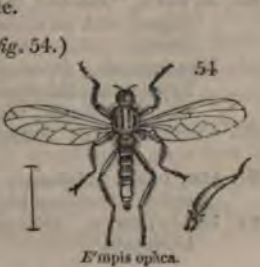
Antennæ porrect, approximating at the base, triarticulate, the two basal joints very closely united, so as apparently to constitute one; third joint not ringed. *Hypostoma* not bearded, flat. *Frons* flat. *Proboscis* horizontal, exserted, short. *Trunk* very gibbous. *Abdomen* slender, with 7 segments. *Halteres* naked. *Wings* parallel, incumbent.

73. HY`BOS. *Antennæ*, third joint conic, with an apical pubescent seta. *Hind femora* clavate.

74. OCYDRO`MIA. *Antennæ*, third joint lenticulate (of the form of a lens), with an apical seta. *Legs* all simple.

75. ŒDA`LEA. *Antennæ* third joint elongate, compressed, without an apical seta. *Hind femora* (thighs) clavate.

Fam. X. EMPI'DIÆ. (*fig.* 54.)


54

E'mpis opaca.

Antennæ porrect, approximating at the base, triarticulate; third joint not ringed, the apex with a style or seta. *Hypostoma* not bearded. *Ocelli* 3. *Proboscis* exserted, very perpendicular. *Palpi* incurved. *Abdomen* with 7 segments. *Wings* parallel, incumbent. *Onychii* 2.

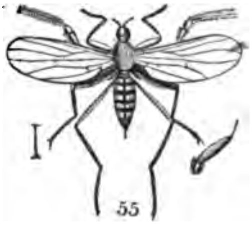
76. HI'LARA. *Antennæ*, third joint subulate, with an apical style. *Proboscis* shorter than head. *Wings* with an oblique transverse nervure at the apex.

77. Brachy'stoma. *Antennæ,* third joint conic, with a very long terminal seta. *Proboscis* the length of the head. *Wings* with an oblique transverse nervure at the apex.
78. Glo'ma. *Antennæ,* third joint globose, with an apical seta. *Wings* with an oblique transverse nervure at the apex.
79. *E'*mpis. *Antennæ,* third joint conic, with an apical style. *Proboscis* longer than the head. *Wings* with the transverse nervure at the apex very perpendicular.
80. Rhamphomy'ia. *Wings* without a transverse nervure at the apex.

Fam. XI. TACHYDRO'MIÆ. (*fig.* 55.)

Antennæ porrect, approximating at the base, biarticulate, with an apical seta. *Ocelli* 3. *Proboscis* short, perpendicular. *Palpi* incumbent on the proboscis. *Abdomen* with 7 segments. *Onychii* 2.

81. Hemerodro'mia. *Anterior coxæ* elongate.
82. Tachydro'mia. *Anterior or intermediate femora* incrassate.
83. Dra'petis. *Legs* all alike.

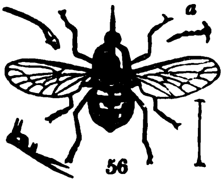


Tachydròmia fasciàta, and three various forms of antennæ.

Fam. XII. INFLA'TÆ. (*fig.* 56.)

Antennæ very minute, biarticulate. *Head* almost wholly occupied by the eyes. *Ocelli* 3. *Abdomen* very thick, with 5 segments. *Onychii* 3.

84. Cy'rtus. *Proboscis* exserted, longer than the head.
85. Acro'cera. *Proboscis* concealed. *Antennæ* vertical.
86. He'nops. *Proboscis* concealed. *Antennæ* inserted on the superior margin of the mouth.

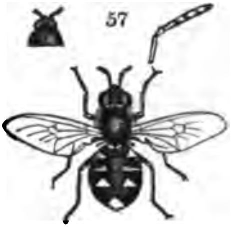


Cýrtus gibbus.

Fam. XIII. STRATIO'MYDÆ. (*fig.* 57.)

Antennæ porrect, approximating at the base, triarticulate; third joint ringed. *Proboscis* with only the labella exserted. *Ocelli* 3. *Abdomen* with 5 segments. *Onychii* 3.

87. Pachyga'ster. *Antennæ* third joint globose, 4-ringed, with a terminal seta. *Scutellum* unarmed.
88. *Sa'*rgus. *Antennæ,* third joint lenticulate, 3-ringed, with an apical seta. *Scutellum* unarmed.
89. Nemótelus. *Antennæ* inserted on a conical hypostoma; third joint fusiform, or spindle-shaped, 4-ringed, with an apical style. *Scutellum* unarmed.
90. Clitella'ria. *Antennæ,* third joint conic, 5-ringed, with an apical style.
91. Oxy'cera. *Antennæ,* third joint fusiform, 4-ringed, with an apical style. *Scutellum* bispinose.
92. Strati'omys. *Antennæ,* third joint sub-fusiform, 5-ringed. *Scutellum* bidentate.



Stratiomys furcàta (fem.), and head of S. concinna, (male).

ART. X. *Illustrations in British Zoology.* By GEORGE JOHNSTON, M.D. Fellow of the Royal College of Surgeons of Edinburgh.

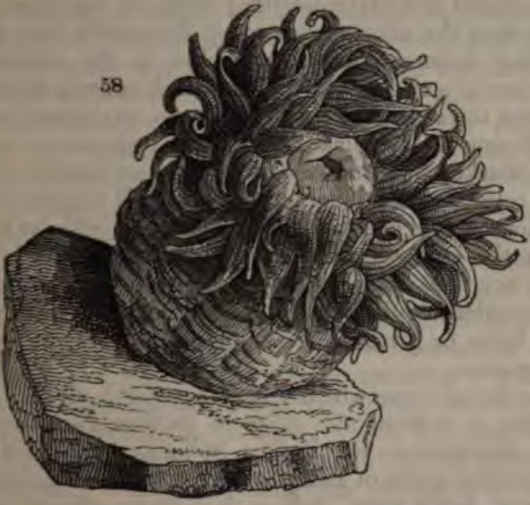
2. ACTI'NIA TUE'DIÆ. (*fig.* 58.)

Cl. Radiàta, Ord. Echinodérmata, Fam. Fistùlides, Gen. Actínia.

A. — Corpore crasso, cylindraceo, lævi aut rugis sponte circinato; tentaculis crassis, numerosis, conicis, striatis, castaneis, corpore brevioribus.

A. — Body thick, somewhat cylindrical, smooth or wrinkled, with circular folds; tentacula thick, numerous, conical, longitudinally striate, chestnut-coloured, shorter than the body.

58



THE only British species of this genus to which the one before us has any relation is the Actínia sulcàta, described and figured by Dr. Gaertner in the 52d volume of the *Philosophical Transactions*, p. 78. t. 1. fig. 1. Both species correspond, or at least do not differ materially, in colour and size; and they are both equally incapable of retracting and concealing their tentacula within the oral aperture; but they differ in the relative proportions between these organs and the body, and in the sculpture of the latter, which in A. sulcàta is grooved in a longitudinal direction; and this character forms so prominent a part both in the figure and description of Gaertner, that an animal destitute of any such markings, as ours is, seems entitled to the rank of a distinct species; the more particularly, as neither Dr. Gaertner nor myself have drawn up our descriptions from one, but from the examination of several individuals.

Actínia Tuèdiæ is amongst the largest of our species. The body, when relaxed, generally measures 3 in. in length, and about the same in diameter; it is of a uniform reddish or brownish-orange colour, and either smooth or contracted at pleasure into circular folds. The base is smooth and orange-coloured, with a thin areolar skin. The mouth is ever varying in size and form; and there are often protruded from it vesicular-like lobes of a reddish colour, scored with fainter lines. When fully expanded, the oral disk is not less than 4 in. across; there is a smooth space between the mouth and tentacula, which are very numerous, and placed in several rows around the circumference; those of the inner row are larger than the others, measuring frequently 2 in. in length, and they become gradually smaller in the exterior series. They are of a chestnut or reddish flesh colour, often darker-coloured towards the bases, but never variegated with rings of different hues; thick and clumsy, tapered to an obtuse point, marked longitudinally with distinct lines or impressed striæ, tubular, perforated at the ends, and constricted at their insertions. The creature has no power of withdrawing them within the oral aperture, as the greater number of Actíniæ have; nor does it seem capable even of shortening them in any considerable degree, but it twists them in a wreathed or spiral form, or gives the whole circle a greater or less degree of expansion.

The trivial name which I have bestowed on this species is intended to indicate the place of its first discovery, Tuedia being, according to Sir Robert Sibbald, the ancient name of the maritime parts of Berwickshire. It is not uncommon on this coast, but is found only in deep water, whence it is dragged up by our fishermen. I have often found the tentacula, in a separate state, adhering to their lines; and as these retain their irritability and motion for a long time, they are apt to be mistaken for independent and perfect worms, which they much resemble. Our figure represents the animal about one half of its natural size. I am, Sir, yours, &c.

George Johnston, M.D.

Berwick upon Tweed, *Jan.* 7. 1832.

Art. XI. *Volcanoes.* By W. M. Higgins, Esq. F.G.S., and J. W. Draper, Esq.

From the similarity which is observed between inorganic objects in all countries, it may be supposed that there is less value in the detail of observations relating to them than in those investigations which are directed to other branches of natural science. This is a mistake into which nearly all early scientific travellers fell. When they visited a foreign country, they found themselves surrounded, both in the vegetable and animal creation, with so many novel objects, that they paid little or no regard to the physical and geological characters of the district, but satisfied themselves and their readers with a vague remark that it was more mountainous or level than this or that portion of their native country; and was formed of granite or sandstone, resembling that which occurred at some other specified place. But as soon as the science of geology attracted the attention of naturalists, the importance of an extensive observation of inanimate nature was generally admitted; for it required little experience to discover that by this means alone any knowledge could be obtained of the superposition of rocks and their probable formation. But in spite of the extended observations which have been recorded, these problems are still hypothetical points in geology, which cannot be satisfactorily determined from the data we possess. Geology must be brought to the simple but noble condition of a practical science; and, like chemistry, watch over its accumulating facts, jealous of hypothesis. So long as Stahl and Beccher haunted chemistry with their phlogistic phantom, every phenomenon was wrapt in the mist which it generated. But, in speaking of geology, almost every author has found a world which can only exist so long as it preserves the character which his imagination has given it; and could not have existed at all, had it not been formed according to his opinions. When geologists are cured of the mania which has seized them, and turn their powerful energies to the discovery of facts, our knowledge of volcanic districts, and the phenomena which attend volcanic activity, will proportionally increase; for the geologist alone is capable of making those observations upon which rational opinions can be formed. There was a time, and it is almost within the memory of some of our readers, when the mounts Etna and Vesuvius were made the types of universal volcanic action; but the more extended observation of modern science has already given us a juster conception of this subject, has exposed many facts presumed to be connected with their causes, and made us tolerably acquainted with their geological position and periods of activity.

There is no term more vaguely applied than the word volcano. Sometimes it is used to signify hot springs; at other times, cones which eject mud, as at Turbaco in South America; while by other writers it is applied in the same page to a fissure through which a column of smoke is projected, and to immense mountains that eject liquid rocks. Now, how certain soever it may be, in the theories of some speculatists, that they all derive their origin from the same cause, some difference should be made in language: and therefore, instead of applying the term to every situation in which heated substances are ejected, we shall confine it to those elevations which are terminated by an interior cavity, and appear to have ejected liquid earths.

There has been much doubt among geologists whether we are to attribute hot springs to the same agent as volcanoes. In some instances there can be no doubt that they derive their caloric from the same source, but in others there seems every probability that it arises from other causes. Few persons, for instance, would doubt that the geysers of Iceland have an intimate connection with the numerous volcanoes with which that singular island abounds: but there may be a reasonable scepticism in attributing the hot springs of our own country, most of which arise in the lias beds, so remarkable for sulphuret of iron, to the same cause.

Volcanoes, according to our definition of them, may be divided into two classes, extinct and active. There is some difficulty in determining when a volcano may be considered extinct; for, in our own times, craters which have not suffered eruption in the age of history, have suddenly assumed all their activity, and, with renewed energy, spread their destructive effects over the adjacent districts. We must, then, regard all volcanoes extinct which have not been active in the memory of history, till some proof of present activity be given.

One of the most interesting series of extinct volcanoes with which we are acquainted is that of Auvergne in France. The most recent of these had certainly no relic of activity at the time Julius Cæsar invaded Gaul; for although he encamped upon them, he has not referred to their volcanic origin. How long before this they became extinct we cannot say, as no historical records refer to them.

The most recent part of this district is that to the west of Claremont (Scrope's *Central France*). This fact is not determined by any distinctive difference in the characters of the lava, for the deductions formed on these have ever been found erroneous, but from its position. For in some instances it has flowed down the contiguous valleys, and hence was ejected after the valleys were excavated; while in other instances it only occurs as an outlier, or, in other words, caps the hills which surround these valleys; and hence was formed before the valley, as its excavation has destroyed the continuity of the beds. Now, it is generally acknowledged that these valleys were formed by the last great diluvian action; therefore we have a convenient and natural division of extinct volcanoes into ante and post diluvian.

For the sake of illustration, let us suppose *fig.* 59. to represent a chain of hills, in which the outliers *a*, *b*, and *c* are composed of the same volcanic rock. It is evident, we think, from their situation and dip, that they were once continuous, and that the catastrophe which excavated the valleys destroyed the intervening portions of the bed: therefore the valley is antediluvian. But if we find the cone *d* and its contiguous valley to be covered with a bed of lava, there will be no danger in ascribing to it a postdiluvian origin.

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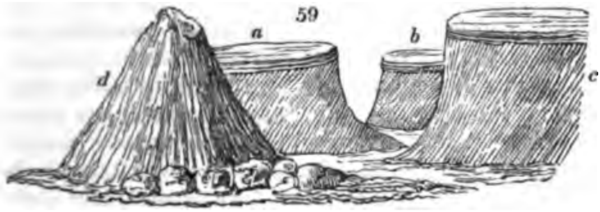

It is not uncommon to find volcanic rocks, or, at least, rocks which so much resemble those which are now produced by volcanoes, that few geologists, reasoning by analogy, doubt their igneous origin, alternating with, or interposed between, stratified deposits. The rocks of this class are generally known by the name of trap, and consist of greenstone, basalt, porphyry, &c. The rocks of the Pic du Midi de Bigorre (Schubert), for instance, particularly the limestones, are generally superposed by trap. At Christiania, in Norway, slate and grauwacke are covered by a bed of porphyry, not less than 1600 ft. in thickness; " and in another part of the country, at Holmestrand, the same mass of porphyry, covering beds of sandstone, is seen to pass in the lower part, by almost insensible gradations, into a hard, fine-grained, black basalt, containing brilliant crystals of augite." (Bakewell's *Geology.*) In the Island of Skye, red sandstone is traversed by a great number of trap veins, and in some places is superposed by this rock. The alternation of rocks observed in Lamlash is sandstone, trap, conglomerate, and clinkstone, the whole of which is intersected by a vein of spheroidal trap. (Macculloch's *Western Isles.*)

Active Volcanoes may be divided into aerial * and subaqueous, or those which have their craters exposed to the action of the air, and those which are under the water. There must be a considerable difference between the phenomena which attend these classes; namely, in proportion to the density of the obstructing medium. At present, however, our knowledge of the phenomena which attend subaqueous activity is exceedingly circumscribed: we shall, however, separately consider the phenomena which precede and accompany the activity of these two classes of active volcanoes.

The points of enquiry that most forcibly strike the attention, when thinking upon the volcanic agent, are the phenomena which precede and attend its activity, the geographical position of volcanic mountains, and the character of the substances they eject. We are then, by a natural train of thought, led to enquire what can be the cause of these destructive phenomena, and what the methods by which volcanic mountains are formed and destroyed. These are the subjects which will chiefly demand our attention in the following pages; and will, we hope, develope all the most important and striking facts connected with the subject.

The Phenomena which precede volcanic Action. — In every age of the world there have been some who, separating themselves in part from the common amusements of mankind, have devoted their leisure to the investigation of natural phenomena. These have searched into the secrets of Almighty Intelligence, and gazed in admiration upon the beauty of his creatures, and the contrivance displayed in their formation. But the more solemn and destructive of his agents, in their moments of sublime excitement, have drawn the attention of those who were unimpressed by Nature in her periods of beautiful repose. The accuracy of this remark will be admitted by those who have never witnessed a more violent disturbance than a passing thunder-storm; but how much more fully would it be received by those who have gazed on their native hills when torn by the impetuous tide of subterranean fire! It is the importance which all men attribute to unfrequent phenomena, and particularly when of a fearful character, whether they are seen, or known by tradition, that has furnished us with an ample fund of information concerning the many volcanic mountains with which every quarter of the globe abounds.

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* We have preferred the term aerial to sub-aerial, because the subaqueous may be said to be under the air as well as those exposed to the action of the atmosphere.

From these observations it appears that the phenomena which precede volcanic eruptions of the same class, universally present a remarkable similarity of character, though they greatly vary in power. The energy chiefly depends upon the force required to open a passage for the liquefied mass, and the attendant gaseous fluids. Hence it is that the phenomena which result from the activity of a subaqueous volcano are probably very different from those which attend an aerial eruption. Particular attention, therefore, must always be paid to the situation of the vent, and the density of the fluid resisting the volcanic energies. On this account it is necessary that we should in this and the following section take a separate view of these classes.

If the vent of a habitual volcano, whether aerial or submarine, be much obstructed by the accumulation of a large quantity of the lava resulting from a previous eruption, greater power will be required to force the heated matter through the crust of the earth, than if no such obstruction were presented. And if it be necessary to form an entirely new vent, a still greater force must brought into action, and that in proportion to the solidity, position, and weight of the superposed mass. There is not, we believe, a single instance within the range of historical records, in which a new vent has been formed in a country never before the seat of volcanic action. It is not uncommon to hear of the eruption of volcanoes that have been supposed extinct, nor is it improbable that entirely new vents are sometimes formed in the neighbourhood of those situations where the same power has before exerted its energies. In both these cases the great obstruction presented to the volcanic agent by superposed rocks has been removed by former eruptions, and therefore but little increase of power is required to force a passage for the melted materials. We might, perhaps, deduce from this fact, either that the volcanic energy has decreased, or that there is such a connection in the subterranean abyss, that the weakest portion of the earth's crust is broken, which is a volcanic vent: but we forbear to theorise.

Having premised these general observations, we may now enquire into the character of those phenomena which precede volcanic eruption. The most invariable of these is earthquake. The same night that Lima was destroyed by earthquake, four new volcanic vents were formed in the Andes. In the year 447, the earth was convulsed for six months, almost without intermission, from the Black to the Red Sea; and on the 20th of May, 520, Antioch was destroyed, and 250,000 of the inhabitants buried in its ruins. Soon after the earthquake at

Lisbon in 1755, various parts of the world suffered under the effect of a similar cause, and within a few succeeding years there happened some of the most violent eruptions that ever afflicted the world. In 1759 the American continent was dreadfully agitated, and Jorullo was in a condition of violent eruption, attended with some most remarkable phenomena. In 1760, Vesuvius opened at once fifteen fissures, and from each vomited immense volumes of lava; and during the same year Kattlagiaa, in Iceland, broke out with intense paroxysmal violence, attended with such electric phenomena as were never before witnessed. Thirty days after the destruction of the city of Caraccas, the volcano of St. Vincent became active; and at the moment it broke forth, a subterranean noise was heard, and the earth was shaken for nearly 2200 square leagues. From these, and numerous other similar facts which we might have selected, it will be evident that earthquake of most alarming character frequently precedes volcanic eruption; but it is only when the activity is very intense that the earth is thus severely shaken. We should, perhaps, be warranted by facts, in stating that the violence of the earthquake is always a criterion to the intensity of the subsequent eruption; but, however this may be, we do not remember an instance in which volcanic action has not been preceded by earthquake. But earthquake has frequently been unattended with eruption, which may have resulted either from a want of sufficient energy to form a vent, or from the escape of the gases generated by the subterranean heat.

The violence of an earthquake seldom lasts more than a minute; but successive shocks are sometimes felt at very short intervals. During the agitation immense chasms are frequently formed, through which flames, torrents of water, or dense volumes of gaseous fluid, are thrown. The effects, therefore, of earthquakes, independent of the volcanic action which usually follows, are of a most extensive and dreadful character, and little inferior to the actual ejection of lava. A more appalling description of the consequences of an earthquake cannot be given than a relation of the circumstances that followed this awful catastrophe in 1638, as observed by Kircher. The father was on his way to Euphemia; but so violent was the agitation of the water, and so dreadful the noises which seemed to issue from it, that it was found impossible to proceed, and he landed with his companions at Lopizicum. "Here," he says, "scenes of ruin appeared everywhere around me; but my attention was quickly turned from more remote to contiguous danger, by a deep rumbling sound, which every moment grew louder. The place where we stood shook dreadfully. After some time the violent paroxysm ceased. I stood up, and turning my eyes to Euphemia, saw only a frightful black cloud. We waited till it passed away, when nothing but a dismal and putrid lake was to be seen where the city once stood."

If such are the effects of earthquakes, it is not surprising that the inhabitants of those countries in which they have been felt, should be seized with an extreme terror at the least agitation of the earth. Captain Basil Hall states, in his interesting *Voyage to Chili and Peru*, that when paying a visit at Valparaiso, the whole party was suddenly thrown into a state of violent alarm, and rushed into the street, crying, *Misericordia! misericordia!* The whole population seemed to have been aroused by the same feeling; the streets were filled with people in a state of wild confusion and alarm. The cause of this instantaneous terror was, our traveller afterwards found, a violent shock of earthquake, though he was perfectly unconscious of the least motion. But Humboldt describes the feeling experienced on the coast of Peru in a far different manner. "From our infancy," he says, "the idea of certain contrasts fixes itself in our mind; water appears to us an element that moves, earth a motionless and inert mass. These ideas are the effects of daily experience; they are connected with every thing that is transmitted to us by the senses. When a shock is felt, when the earth is shaken on its old foundations, which we had deemed so stable, one instant is sufficient to destroy long illusions. It is like awakening from a dream; but a painful awakening. We feel that we have been deceived by the apparent calm of nature; we become attentive to the least noise; we mistrust, for the first time, a soil on which we had so long placed our feet with confidence. If the shocks be repeated, if they become frequent during successive days, the uncertainty quickly disappears. In 1784, the inhabitants of Mexico were accustomed to hear the thunders roll beneath their feet, as we are to witness the vivid flash in the region of the clouds. Confidence easily springs up in the human mind; and we end by accustoming ourselves, on the coast of Peru, to the undulations of the ground, like the sailor to the tossing of the ship caused by the motion of the waves." (*Pers. Nar.*, vol. iii. p. 321.)

The shocks of an earthquake are invariably most violent in volcanic countries, but not in those parts which are nearest to the seat of volcanic action. The effects, however, are sometimes very extensive. During the earthquake at Lisbon in 1755, the waters in every part of Europe were agitated, and in some places became thick and turbid. Lake Ontario also felt its effects, and the sea round the Eastern Antilles, Antigua, and its neighbouring islands; and, although the tide is not known to rise more than 18 inches, it suddenly rose 20 feet.

The atmospheric and other phenomena which usually accompany earthquake, and consequently precede eruption, are, an unnatural calmness of the air, a violent and remarkable agitation of the sea, the sudden bursting forth of sulphureous springs, deep rumbling sounds, and violent explosions, resembling the discharge of artillery. The phenomena which precede subaqueous activity are precisely similar to these, except as they may be affected by the mass of water which covers the vent.

(To be continued.)

Art. XII. *On the Effects produced by the Precession of the Equinoxes.* By Sir John Byerley, F.R.S.L.

(Continued from Vol. IV. p. 316.)

Sir,

In advancing a new theory, I had not the ridiculous pretensions of imagining that it would at once attain universal, or even general, assent. The astronomical system of Ptolemy and the vortices of Descartes have still their partisans, who look down with pity on Copernicus and Newton. Even whole scientific academies have adopted errors which a schoolboy of the present day would blush for. To cite only two relative to my subject:—In 1693, the French Academy of Sciences decided that it was preposterous to suppose that the sea and land on the globe did not present an equal extent of surface. Sir Isaac Newton had determined, by theory, the earth to be an oblate spheroid; but, strange to say, the measurement of a degree of the meridian, by the French mathematicians, which ought to have confirmed Sir Isaac's theory, led the French Academy of Sciences to an opposite conclusion; and for forty years they taught the world to believe the earth to be a prolate spheroid; or sharpened, instead of flattened, at the poles.

As to theories of the earth, they are innumerable; all beautiful, all poetical; from Burnet and Whiston down to Buffon and Delisle de Sales; the latter of whom supposes the solar system to consist of about 17,000,000 of planets and comets.

They are all advocates of a central fire, which they probably caught from Newton; who, in one of his few aberrations in science, had calculated that the comet of 1680 was, at its perihelion, 2000 times hotter than red-hot iron. Chemistry was then in the infancy in which Boyle had left it, and no one asked himself the question whether comets possessed such a capacity for caloric, or whether the solar rays were really hot. It is very poetical to talk of "The golden orb, pouring forth floods of light through boundless space:" we now know that planetary space is neither warmed nor illumined by the solar rays; all is cold* dark night, save within the atmospheres of the planets; there, the solar rays, acting on the atmosphere, produce combustion, from which light and heat are evolved. This is one argument against a central fire: but before I develope the whole of the new theory, I wish the truth of its basis to be brought to the test of actual experiment.

I have advanced that the ecliptic is a real circle on the earth; that, by the precession of the equinoxes (arising from the earth's figure) the equator cuts it in a different point every year, returning to the same point in 25,920 years (according to De Lambre). By this motion, the poles of the equator revolve round the poles of the ecliptic on a radius of 23° 28′, or about 1400 geographical miles. Thus far astronomers agree with me; and here, I am sorry to say, we part company. They do not admit that this can produce any changes on the earth's surface; whereas I attribute nearly the whole of them to it, and I will even appeal to them, and them alone, to decide the question.

Now, if, as I assume, the pole of the equator revolves in the circumference of a circle of 2800 miles in diameter, all churches and buildings erected due north and south, even only one hundred years since, are no longer so; that no sundial erected the same length of time is at present correct; that no meridian, traced with care at such a period, is at present true; that all latitudes and longitudes, determined with the utmost care 50 to 100 years since, differ from those taken by recent observers; and that it is easy to state beforehand not only on what side the supposed errors lie, but their amount.

I do not wish to prejudge the question; as I have already stated, the astronomers shall decide it: but I may be permitted to state a few historical facts in support of the theory I advance.

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* The late Baron Fourier, perpetual Secretary to the Royal Academy of Sciences of Paris, calculated planetary space to be 90 degrees below the freezing point of Fahrenheit.

Tycho Brahé traced a meridian at his observatory, at Uranienburg, which M. Picart found incorrect, and declining to the west. Cassini traced one in the cathedral of Milan, in which the same error is found.* All who have recently determined, by astronomical observation, latitudes and longitudes suppose their predecessors to have not taken due care, or to have had defective instruments; and M. de Pouqueville, in his excellent *History of Greece*, informs us that the Venetians laid down all the Greek coasts falsely in their charts, in order that the vessels of other nations might be stranded: a hard sentence on the husbands of the Adriatic, which we may probably be able to reverse.

To put, therefore, my theory to the test, I earnestly entreat that astronomers and persons possessing exact chronometers, will, at the approaching equinoxes, ascertain whether our cathedrals, churches, abbeys, &c., are now in the meridian, and whether old sundials are not also erroneous. If my theory be true, and that they were, when built, erected correctly to the four cardinal points, they will all, without exception, be now found to decline to the west; and from the quantity of the declination the date of their erection may be ascertained to four or five years: this is a new *art de vérifier les dates*, which, if founded in truth, will be of great importance in chronology.

The communication of the results to your valuable work I earnestly solicit, whether they be for or against me.

"If right, I'll smile; if wrong, I'll kiss the rod."

London, Feb. 1. 1832. J. Byerley.

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* I wrote to our astronomer royal, Mr. Pond, to ask if the meridian which I supposed must have been traced by Flamsteed was now correct. Mr. Pond obligingly informed me that there existed no traces of Flamsteed's meridian at the royal observatory of Greenwich.

REVIEWS.

Art. I. *A Manual of the Land and Freshwater Shells of the British Islands, with coloured Plates of every Species.* By W. Turton, M.D. Foolscap 8vo. London, Longman, 1831. 10*s.* 6*d.*

This is a very neat and beautiful little volume; and will be, we doubt not, a very acceptable present to the bulk of British conchologists, since it will enable them to classify their collections of native land and freshwater shells according to the most approved system of the day, and to attach their respective names with facility and with certainty. The descriptions of the species are not merely correct: they are remarkable for elegance, perspicuity, and propriety of language, the technicalities of the science being used only on necessary occasions; while the figures are characteristic, and both engraved and coloured in a very creditable manner.

We know not that we can say more in favour of the book, and it would not have been just to its author to have said less. Its main defect lies in the want of information relative to the anatomy, physiology, and habits of the animals. Müller said, long ago, that we had amused ourselves sufficiently with shells, had expressed enough of wonder about their forms and colours; and that it was time to leave these things to children, and bind ourselves up like men to study the living inmates, their structure, and manners. How the call has been answered on the Continent, it boots us not to enquire: in this country it found no responsive echo; and if at this late hour we begin to feel and acknowledge its justice, it must, nevertheless, be granted, that very few among us (and Dr. Turton is not of the few) even yet cultivate this department of natural science as Müller bade us, and as common sense would dictate. The greater number of our living conchologists care more for rare species, and perfect specimens, and pretty and uncommon varieties, and such similar absurdities, than for the anatomical discoveries of a Lister or a Cuvier, for the high discussions of a Lamarck, or even for the economical observations of a Müller and a Montagu.

The history of conchology in Great Britain during the present century is, indeed, any thing but creditable to the reputation of us who are conchologists. If we except some few but excellent detached essays in the journals, and, perhaps, Sowerby's *Genera of Recent and Fossil Shells* (for even in that work the animal plays too subordinate a part), there has not been published, during the thirty-one years which have elapsed, a single work that is worthy of the advanced state of our knowledge, a knowledge contributed almost entirely by foreigners. The introductions most popular amongst us * are bare expositions of a system which in every step runs counter to nature and to sense, with a supplementary explanation of useless terms, or of terms which require no explanation. Other introductions there are, we are quite aware; but even these are merely systematical, and make no pretensions to originality: and what are our recent systematic works but repetitions of a twice-told tale, descriptions of things which have been described as well before, without spirit, or life, or variety? On running over these works, one might suppose that the animal was beneath a naturalist's notice, so sedulously is every particular relative to it avoided; and if a chance remark is made, it is done with all caution, and as a by and by affair. There, for example, lies before us the *Conchological Dictionary* of Dr. Turton, where we see in every page a mark that the author had seen the species in a living state: but he would be a most credulous man who should turn to that volume for any useful knowledge. And this is the more to be regretted, as few have had, or can have, the opportunities of our author in investigating the economy of these animals. Who that is not a mere conchologist — who does not envy him, in particular, the possession of his noble Sérpulæ? and who, that ever saw the tenants of even our common species, does not regret that they had fallen into hands who knew not their value and their curious beauty? Conchologists deem little of the pleasure, the interest, or the nobleness of their study, when they confine themselves to the examination of the outward and inorganic covering.

Dr. Turton himself seems now aware of this. Conchology, he tells us, in the dedication of the present volume, "is scarcely beyond its infancy." And again he says:— "Till the animal has been dissected and accurately displayed, specific distinction can hardly be determinately fixed." Although these opinions are not ours, yet they are not unwholesome ones; but, unfortunately for Dr. Turton, they are opinions merely, for he has taken no steps to loosen Conchology from her leading-strings; he has made no dissections of species, and vastly few observations even on their outward form. We are told that some families have four, and some two, tentacula; and that these organs vary in shape, and have eyes on their tips or at their bases; but beyond these novelties this deponent sayeth not. This deficiency, we repeat, is to be regretted; for, had he entered even on some economical details, he would have added very much to the interest as well as usefulness of his volume: and, as a proof of our assertion, we will refer to his own article on Hèlix pomàtia, which, we feel certain, his readers will regard as the best and most entertaining in the book. Even on that article, Dr. Turton will excuse us for making two remarks. "The calcareous epiphragm, with which the animal closes the shell during winter, is dissolved upon the approach of summer," says our author; "not by the increased heat of the atmosphere, but by a *phosphorous* acid which at that season it abundantly secretes." The evidence on which the acid is pronounced to be *phosphorous* ought, we think, to be stated; for it is very singular to find an animal, that exudes its calcareous matter in combination with carbonic acid, secreting a very different acid for its solution: and, were it proved that the acid was phosphorous, some light would be thrown on certain points in the general doctrine of the formation of shell which are still very doubtful. Our second remark is of a matter much less important. "At one period," says Dr. Turton, "it seems that they (Hèlix pomàtia) were admitted at our own tables; as Lister, in his *Hist. Anim. Angl.*, p. 111., tells us the manner in which they were cooked in his time: — 'They are boiled in spring water, and, when seasoned with oil, salt, and pepper, make a dainty dish.'" The quotation, it is obvious, has neither meaning nor point, unless Dr. Turton means that we shall infer from it that, according to Lister, snails were thus dressed in this country; but, if we turn to Lister, we shall find he says no such thing. Lister's assertion is, that they are very commonly eaten "in Gallia Narbonensi" (that, surely, is not Britain); and are also sold in great quantities in Paris during the season of Lent; and, after giving us this information, he adds the cookery receipt translated by Dr. Turton, leaving us to infer, as a matter of course, that they were so cooked in Paris. Dr. Lister, in fact, says not a word of their being eaten in Britain, although he, perhaps, made the trial himself; for he avers that the animal is very fleshy, nor just altogether nauseous ("nec palato nimium ingratum"). Now, after this exposition, we might, in our capacity of critics, charge Dr. Turton with wilfully concealing the truth, and making partial extracts to suit and prop up his argument; but this be far from us, for we sincerely believe that the memory only is here to blame, and at fault; and we have entered into the discussion to show the doctor how easy a matter it is to get up heavy charges against good and honourable men, such as he himself has made against such men in the preface to his *Dictionary*, and in a manner which is scarcely excusable.

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* The works alluded to are those of Brown, Brooks, and Burrows; of which the latter has reached a second edition: the best proof possible of its popularity. Brown says (1816), of the Linnæan system, that no one has been able to supersede it by a better; and that "its beauties must perpetuate its preeminence." The perpetuity of Captain Brown is, we suppose, a cycle of about ten years; for in his late work, entitled *Illustrations of Conchology*, this preeminent system has not the precedence, and newly proposed genera are adopted in such numbers as to alarm even our reforming spirit. Brooks and Burrows are no less laudatory of the Linnæan system, and abusive of every other; but they are consistent.

Art. II. *A Flora of Berwick upon Tweed.* By George Johnston, M.D. &c. Vol. II. Cryptogamous Plants. 8vo, 330 pages, and plates. Carfrae, Edinburgh; Longman, London; 1831. 7*s*. 6*d*.

We had the satisfaction of noticing the first volume of this judicious and agreeable work in Vol. II. p. 234., containing the phænogamous plants growing around Berwick. The present contains that miscellaneous assemblage of vegetation which is usually comprehended under the term cryptogamous; or, which will be better understood by ordinary readers, those plants which propagate themselves by mysterious methods. It is that residuary bit of vegetable nature which is left after we have disposed of the more intelligible portion. The different orders of it have no common characters, and they are grouped together chiefly on the ground of convenience. A mushroom and a moss are distinguished easily enough by the most careless observer; yet the ordinary mode of classing them near each other is apt to mislead the beginner, by his inferring that this contiguity in arrangement points out a similarity of structure. No such inference must be drawn; but the student must study, if he would study usefully, each tribe separately, and as a distinct form of nature. Having done this, he is at liberty to discover as many similarities and analogies as he can find. Dr. Johnston has pursued this course, and it is a discreet and safe one. We should have preferred to have seen the *Chàræ* among the unknown residue.

We are pleased to have it in our power to add (what, by the way, we seldom can do) an observation to the facts stated by the author respecting the silex in the *Equisètum hyemàle*, commonly sold under the name of Dutch rushes, for the purpose of polishing wood and ivory. If the rush be burnt carefully, a residuum of unconsumable matter will be left, and this held up to the light will show a series of little points, arranged spirally and symmetrically, which are the portions of silex the fire had not dissipated; and it is this serrated edge which seems to render the plant so efficient in attrition. Wheaten and oaten straw are also found by the experience of our good housewives to be good polishers of their brass milk vessels, without its being at all suspected by them that it is the flint deposited in the culms which makes it so useful.

The author has taken great pains to make out those sceptical species of ferns, passing under the names of Aspídium aculeàtum, vulgàre, and lobàtum, and has given a plate to illustrate the subject. Those who are curious in such distinctions will do well to refer to him; but "de minimis non est disputandum." In the ferns and lycopodiums, the author has followed the nomenclature of Sir J. E. Smith, "dignissimus Linnæi hæres" ["the worthy successor of Linnæus"], as Sprengel designates him: and, at parting with his candid and erudite guide, passes a just eulogium on his merits, which will be appreciated by all who delight in the calm pursuit of his favourite science.

Dr. Johnston's list of mosses is very small, and we suspect might be much increased by those who devote themselves more particularly to this family. He has followed, in his arrangement, Drs. Hooker and Taylor. The *Fúngi* and the *Algæ* have engaged more of his attention; and the reader cannot fail to be gratified, nay charmed, with the manner in which he treats his subject. We profess not to be learned in this department of Nature's secrets; but we see enough to justify us in recommending the author as a judicious and safe authority; and if the noviciate has any touch of poetry in his composition, and can read the Eternal Author in the glorious book of Nature, he will find Dr. Johnston's second volume, as well as the first, a delightful companion of his musings, and which will convert many an otherwise blank page into one rife with instruction, rouse his dull and dormant admiration, and lead him from the joys without to those within.

> "To sit on rocks, to muse o'er flood and fell,
> To slowly trace the forest's shady scene,
> Where things that own not man's dominion dwell,
> And mortal foot hath ne'er, or rarely, been;
> To climb the trackless mountain all unseen,
> With the wild flock that never needs a fold;
> Alone o'er steeps and foaming falls to lean;
> This is not solitude: 'tis but to hold
> Converse with Nature's charms, and view her stores unroll'd."
> *Byron.*

Now, there is a large class in this world of plodding, industrious, devout worshippers of Mammon, and another class, scarcely less numerous and just as irrational, of proud yet shallow thinkers, who pronounce these "cullers of simples" and other objects of natural history to be the idlest triflers in this trifling world. Yet we, sitting on our hillock of turf, "sub tegmine fagi," and recruiting ourselves after collecting our butterflies and our mosses, denounce all such judges as bigoted and exclusive; and we think we are just as well and as usefully employed as he whose lofty ambition is to die richer than his neighbours, or with a coronet upon his brow. *We* lay our bodies down in peace, with other honours emblazoned upon our escutcheons. *We* accumulate riches, too, but of another kind than gold and silver, though we have our precious stones. The honoured and ennobled of our race leave behind them 50,000 specimens, not pounds, collected from the four corners of the earth. *We* lay up our treasures in shelves, and cases, and cabinets, not in stocks and mortgages; and we have our treasures in heaven, too, for we have "the fruit of the Spirit, which is love, joy, peace, gentleness, meekness, temperance." *We* are also fired with our noble ambitions, as well as others; and we will adduce three living examples, which will stand a comparison with any thing in the lives of those common-place heroes, Alexander and Cæsar. The first is of a learned entomologist, who, hearing one evening at the Linnean Society that a yellow Scarabæ`us, otherwise beetle, of a very rare kind was to be captured on the sands at Swansea, immediately took his seat in the mail for that place, and brought back in triumph the object of his desire. The second is Mr. David Douglas, who spent two years among the wild Indians of the Rocky Mountains, was reduced to such extremities as occasionally to sup upon the flaps of his saddle; and once, not having this resource, was obliged to eat up all the seeds he had collected the previous forty days in order to appease the cravings of nature. Not appalled by these sufferings, he has returned again to endure similar hardships, and all for a few simples. The third example is Mr. Drummond, the assistant botanist to Franklin in his last hyperborean journey. In the midst of snow, with the thermometer 15° below zero, without a tent, sheltered from the inclemency of the weather only by a hut built of the branches of trees, and depending for subsistence from day to day on a solitary Indian hunter, "I obtained," says this amiable and enthusiastic botanist, "a few mosses; and, on Christmas day," — mark, gentle reader, the day, of all others, as if it were a reward for his devotion, — "I had the pleasure of finding a very minute Gymnóstomum, hitherto undescribed. I remained alone for the rest of the winter, except when my man occasionally visited me with meat; and I found the time hang very heavy, as I had no books, and nothing could be done in the way of collecting specimens of natural history."

> "The force of nature could no farther go,
> To make the third she joined the other two."

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ART. III. *Reise in Brasilien.* By Dr. C. F. P. von Martius and Dr. J. B. von Spix. Munich. 4to. Vol. I., 1823; Vol. II., 1828; Vol. III., 1831.

HAVING received from Munich the third and last volume of the *Travels* of Dr. von Martius and the late Dr. von Spix in Brazil, whither these learned persons were sent by the Bavarian government, we extract from it the following picturesque description of the atmospheric changes daily observable in the northern quarter of the Brazilian empire, and of the effects of those changes on the vegetable and animal worlds. This description of a single day answers for almost every day throughout the greater part of the year; for the various phenomena, so minutely and graphically portrayed, recur with a wonderful uniformity. Dr. von Martius, wishing to communicate to his friends some idea of the impression which these phenomena made on him, has inserted in the present volume a leaf from his journal, dated August 16. 1819, in which he noted down, as they occurred, his observations on the extraordinary scene before him. The point from which the observations were made is a country-house, called "the Rossinha," within about a mile of the town of Santa Maria de Belem do Gram Para. This Saint Mary of Bethlehem is situated in a plain on the eastern bank of the Grand Para, at the distance of 16 German miles from the sea. The river Para appears on the map to be a continuation of the Tocatius; but at a point where it communicates with the waters of the Amazons through the canal of Tagepurú, and receives several small streams, it becomes widely expanded, and changes its name with its magnitude. Opposite to Belem, the Rio das Amazonas and the Rio do Para form between them an island called Marajo. The travellers resided at Belem, or Para, as the town is sometimes called, during two different periods of the year: first in July and August; and, on the second occasion, in April, May, and June. At the turn of the season, which takes place in that region in October and November, they were not in Belem, and, therefore, had no personal experience of the changes which then occur. Dr. Martius states, however, that from August to October the climate becomes more dry, and that the rain then recurs less regularly. The proper rainy season begins in November, accompanied by much and long-continued thunder. The rains continue heavy until February and March, but sometimes the period is prolonged. In the interior of the continent the travellers likewise observed this distinction of seasons. In September, when favoured by the wind, they sailed up the river, and experienced the greatest dryness: on the contrary, deluges of rain prevailed on their return in the month of March.

The following is a translation of the leaf from the journal of Dr. Martius, dated Para, August 16. 1819; and describes an equatorial day, as observed near the mouths of the Para and the Amazons: —

"How happy am I here! How thoroughly do I now understand many things which before were incomprehensible to me! The glorious features of this wonderful region, where all the powers of nature are harmoniously combined, beget new sensations and ideas. I now feel that I better know what it is to be a historian of nature. Overpowered by the contemplation of an immense solitude, of a profound and inexpressible stillness, it is, doubtless, impossible at once to perceive all its divine characteristics; but the feeling of its vastness and grandeur cannot fail to arouse in the mind of the beholder the thrilling emotions of a hitherto inexperienced delight.

"It is three o'clock in the morning, I quit my hammock; for the excitement of my spirits banishes sleep. I open my window, and gaze on the silent solemnity of night. The stars shine with their accustomed lustre, and the moon's departing beam is reflected by the clear surface of the river. How still and mysterious is every thing around me! I take my dark lantern, and enter the cool veranda, to hold converse with my trusty friends the trees and shrubs nearest to our dwelling. Most of them are asleep, with their leaves closely pressed together; others, however, which repose by day, stand erect, and expand themselves in the stillness of night. But few flowers are open; only those of the sweet-scented Paull*inia* greet me with a balmy fragrance, and thine, lofty mango, the dark shade of whose leafy crown shields me from the dews of night. Moths flit, ghostlike, round the seductive light of my lantern. The meadows, ever breathing freshness, are now saturated with dew, and I feel the damp of the night air on my heated limbs. A *Cicàda*, a fellow-lodger in the house, attracts me by its domestic chirp back into my bedroom, and is there my social companion, while, in a happy dreaming state, I await the coming day, kept half awake by the buzz of the musquitoes, the kettle-drum croak of the bull-frog, or the complaining cry of the goatsucker.

"About five o'clock I again look out, and behold the morning twilight. A beautiful even tone of grey, finely blended with a warmth-giving red, now overspreads the sky. The zenith only still remains dark. The trees, the forms of which become gradually distinct, are gently agitated by the land wind, which blows from the east. The red morning light and its reflexes play over the dome-topped caryocars, bertholetias and symphonias. The branches and foliage are in motion, and all the lately slumbering dreamers are now awake, and bathe in the refreshing air of the morning. Beetles fly, gnats buzz, and the varied voice of the feathered race resounds from every bush; the apes scream as they clamber into the thickets; the night moths, surprised by the approach of light, swarm back in giddy confusion to the dark recesses of the forest; there is life and motion in every path; the rats and all the gnawing tribe are hastily retiring to their holes, and the cunning marten, disappointed of his prey, steals from the farm-yard, leaving untouched the poultry, to whom the watchful cock has just proclaimed the return of day.

"The growing light gradually completes the dawn, and at length the effulgent day breaks forth. It is nature's jubilee, The earth awaits her bridegroom, and, behold, he comes! Rays of red light illumine the sky, and now the sun rises. In another moment he is above the horizon, and, emerging from a sea of fire, he casts his glowing rays upon the earth. The magical twilight is gone; bright gleams flit from point to point, accompanied by deeper and deeper shadows. Suddenly the enraptured observer beholds around him the joyous earth, arrayed in fresh dewy splendour, the fairest of brides. The vault of heaven is cloudless; on the earth all is instinct with life, and every animal and plant is in the full enjoyment of existence. At seven o'clock the dew begins to disappear, the land breeze falls off, and the increasing heat soon makes itself sensibly felt. The sun ascends rapidly and vertically the transparent blue sky, from which every vapour seems to disappear; but presently, low in the western horizon, small, flaky, white clouds are formed. These point towards the sun, and gradually extend far into the firmament. By nine o'clock the meadow is quite dry, the forest appears in all the splendour of its glowing foliage. Some buds are expanding; others, which had effloresced more rapidly, have already disappeared. Another hour, and the clouds are higher; they form broad, dense masses, and, passing under the sun, whose fervid and brilliant rays now pervade the whole landscape, occasionally darken and cool the atmosphere. The plants shrink beneath the scorching rays, and resign themselves to the powerful influence of the ruler of the day. The merry buzz of the gold-winged beetle and humming-bird becomes more audible. The variegated butterflies and dragon-flies on the bank of the river, produce, by their gyratory movements, lively and fantastic plays of colour. The ground is covered with swarms of ants, dragging along leaves for their architecture. Even the most sluggish animals are roused by the stimulating power of the sun. The alligator leaves his muddy bed, and encamps upon the hot sand; the turtle and lizard are enticed from their damp and shady retreats; and serpents of every colour crawl along the warm and sunny footpaths.

"But now the clouds are lowering; they divide into strata, and, gradually getting heavier, denser, and darker, at last veil the horizon in a bluish grey mist. Towards the zenith they tower up in bright broad-spreading masses, and assume the appearance of gigantic mountains in the air. All at once the sky is completely overcast, excepting that a few spots of deep blue still appear through the clouds. The sun is hid, but the heat of the atmosphere is more oppressive. The noontide is past; a cheerless melancholy gloom hangs heavily over nature. Fast sink the spirits; for painful is the change to those who have witnessed the joyous animation of the morning. The more active animals roam wildly about, seeking to allay the cravings of hunger and thirst; only the quiet and slothful, who have taken refuge in the forest, seem to have no apprehension of the dreadful crisis. But it comes! it rushes on with rapid strides, and we shall certainly have it here. The temperature is already lowered; the fierce and clashing gales tear up trees by the roots. Dark and foaming billows swell the surface of the deeply agitated sea. The roar of the river is surpassed by the sound of the wind, and the waters seem to flow silently into the ocean. There the storm rages. Twice, thrice, flashes of pale blue lightning traverse the clouds in rapid succession: as often does the thunder roll in loud and prolonged claps through the firmament. Drops of rain fall. The plants begin to recover their natural freshness; it thunders again, and the thunder is followed, not by rain, but by torrents, which pour down from the convulsed sky. The forest groans; the whizzing rustle of the waving leaves becomes a hollow murmuring sound, which at length resembles the distant roll of muffled drums. Flowers are scattered to and fro, leaves are stripped from the boughs, branches are torn from the stems, and massy trees are overthrown; the terrible hurricane ravishes all the remaining virgin charms of the levelled and devastated plants. But wherefore regret their fate? Have they not lived and bloomed? Has not the *I'nga* twisted together its already emptied stamens? Have not the golden petals fallen from the fructified blossoms of the Banistè*ria*, and has not the fruit-loaded *A*'rum yielded its faded spathe to the storm? The terrors of this eventful hour fall heavily even on the animal world. The feathered inhabitants of the woods are struck dumb, and flutter about in dismay on the ground; myriads of insects seek shelter under leaves and trunks of trees. The wild Mammàlia are tamed, and suspend their work of war and carnage; the cold-blooded Amphíbia alone rejoice in the overwhelming deluge, and millions of snakes and frogs, which swarm in the flooded meadows, raise a chorus of hissing and croaking. Streams of muddy water flow through the narrow paths of the forests into the river, or pour into the cracks and chasms of the soil. The temperature continues to descend, and the clouds gradually empty themselves.

" But at length a change takes place, and the storm which lately raged so furiously is over. The sun shines forth with renovated splendour through long extended masses of clouds, which gradually disperse towards the horizon on the north and south, assuming, as in the morning, light vapoury forms, and hemming the azure basis of the firmament. A smiling deep blue sky now gladdens the earth, and the horrors of the past are speedily forgotten. In an hour no trace of the storm is visible; the plants, dried by the warm sunbeams, rear their heads with renewed freshness, and the different kinds of animals obey, as before, their respective instincts and propensities.

" Evening approaches, and new clouds appear between the white flaky fringes of the horizon. They diffuse over the landscape tints of violet and pale yellow, which harmoniously blend the lofty forests in the back-ground with the river and the sea. The setting sun, surrounded by hues of variegated beauty, now retires through the western portals of the firmament, leaving all nature to love and repose. The soft twilight of evening awakens new sensations in animals and plants, and buzzing sounds prove that the gloomy recesses of the woods are full of life and motion. Love-sighs are breathed through the fragrant perfumes of newly collapsed flowers, and all animated nature feels the influence of this moment of voluptuous tranquillity. Scattered gleams of light, reflected splendours of the departing sun, still float upon the woodland ridges; while, amidst a refreshing coolness, the mild moon arises in calm and silent grandeur, and diffusing her silver light over the dark forest, imparts to every object a new and softened aspect. Night comes; — nature sleeps, and the ethereal canopy of heaven, arched out in awful immensity over the earth, and sparkling with innumerable witnesses of far distant glories, infuses into the heart of man humility and confidence, — a divine gift after such a day of wonder and delight!"

Art. IV. *Catalogue of Works on Natural History, lately published, with some Notice of those considered the most interesting to British Naturalists.*

Swainson, W., F.R.S. &c., and *Richardson, John*, M.D. F.R.S. &c.: Fauna Boreali-Americana, or the Zoology of the Northern Parts of British America. Part II. containing the Birds, illustrated by numerous Plates and Wood-cuts. 4to, nearly 600 pages. London, Murray, 1831. 4*l.* 4*s.*

This seems a superb production, on which more hereafter.

Rennie, J., A. M.: Notes of a Naturalist; in Time's Telescope for 1832. 8vo. London. 9*s.*

A wreath of pleasing quotations, with a good proportion of poetical ones, interspersed by some original remarks, and distributed into 12 monthly chapters; all form a pleasing, instructive, and appropriate appendage to *Time's Telescope;* and it is pleasing to see Natural History at every turn receiving adaptation to the business and bosoms of all. The engraved device, including the title of "Notes of a Naturalist," is elegant and appropriate; in short, we think, exquisitely tasteful: it is a chain disposed in an ellipsis of miniature pictures, each including some pleasing and well exhibited object of nature.

Samouelle, G., A. L. S., Author of the "Entomologist's useful Compendium," and other works: The Entomological Cabinet, or Natural History of British Insects. In Monthly Numbers, with coloured Plates. Foolscap 8vo. 2*s.* 6*d.* Numbers I. and II. have appeared.

In the pages of this elegant periodical it is the author's intention to apply the results of thirty years' extensive research and observation to the illustration of the orders, the families, the genera, and, lastly, the species, of British insects; and in such a way as to render his work a "hand-book to the juvenile, text book to the tyro, and a magazine to the scientific." w well he is able to effect this desirable object, the published numbers sufficiently evince. In these the insects presented to the reader are elucidated in language sufficiently precise, and at the same time entirely free from the technicalities that too often render entomological works uninteresting to all but the initiated. We have one fault to find, which, however pardonable in works exclusively scientific, cannot be passed over in one that aims at general utility. Mr. Samouelle is a naturalist of long standing, and his constant association with men of science has rendered the correct pronunciation of entomological terms familiar to his ear: but "the juvenile" and "tyros," for whose instruction his work is especially adapted, may not be so fortunate, and they will hesitate at encountering a Greek or Latin word. It is the fear of ridiculous pronunciation that renders the use of systematic names slow of introduction amongst people otherwise well informed. *B*látta orientàlis, for example, is quite as euphonious as cockroach or black beetle, and the sounds themselves as expressive; nor is there any reason in the ears of men why one should be chosen rather than another. The preference arises solely from uncertainty about the pronunciation. Place an accent over the proper vowel, and the difficulty is removed; the word comes trippingly off the tongue, and slides into common use. Nor is the substitution of a more correct term all that is gained by the introduction of systematic nomenclature into the common language of life. Scientific names are usually founded on some fact in the economy or history of the animal, and convey some information, more or less important, regarding the beings to which they are applied. In the instance already adduced, cockroach and black beetle are unmeaning or useless phrases, for the colour speaks for itself: but orientàlis (eastern) involves a portion of the history of the animal, and indicates the region whence it was received. In every case, therefore, the systematic name should be translated, and the reason of its application given, that the word may be enriched with all the meaning of which it is susceptible. We are convinced that we have only to suggest these improvements to secure their adoption. The work, considering the style of the plates, is abundantly cheap, and we hope it will receive the encouragement to which its excellence fully entitles it.

Newman, Edward: Sphín*x* *v*espifórmis; an Essay. 8vo, pp. 54, with engraved diagrams of circles of affinity. London, Westley and Davis, 1832. 4*s.*

Under this unassuming title, the author has furnished an able and talented essay, designed as an enquiry into what is the true natural system. The object of this, the first of a proposed series of essays, is to ascertain the precise point which the *Sphínx vespifórmis* of Linnæus occupies in the animal kingdom; and, in prosecuting this enquiry, Mr. Newman has manifested much comprehensiveness of mind, acuteness of reasoning, and power of illustration. Dissatisfied, as we believe every scientific admirer of natural history is and must be, with every existing system by which animated nature has hitherto been arranged, Mr. Newman, whose attention appears to have been long since awakened to the subject, has attempted to establish a theory based on the circular system of Mr. MacLeay, but abandoning that acute naturalist's quinary arrangement, and substituting in its stead one of a septenary character. Carrying out this idea, Mr. Newman finds that many of the anomalies and difficulties at present experienced are effectually removed; and he anticipates that further research and examination will justify his decided opinion that a series of septenary circles will eventually be found the true natural system.

One feature in the author's theory appears to us deserving impartial and candid examination, that the central group of each series of septenary circles is always that which has the greatest variety of form and character, combining in itself typical forms of all the other groups by which it is surrounded. On this principle he considers Neuróptera to occupy the central position in the Insécta; and that the Libéllulæ, from "their imperial flight, their enormous size, their richly variegated colours, their despotic and cruel habits," must be placed in the "heart's core" of the circle, and rank as "emperors of the insect world." Mr. MacLeay also disallows any such group of animated beings as Insécta: dividing the creatures which we commonly call insects into two orders, Mandibulàta and Haustellàta; and these, with the Crustàcea, Ametabòlia, and *A*rachnöìda, constitute a class which he terms Annulòsa. Mr. Newman, we think with great justice and propriety, restores the expressive term and excellent group "Insécta," and regards the binary division of the group into Mandibulàta and Haustellàta as utterly futile; and really, when we reflect that, to sustain such an artificial division, it is necessary to suppose facts which have no existence, we may be allowed to hesitate, before bending the knee to any authority however great.

Mr. Kirby's order Trichóptera, the leading character of which, as given by himself, is "Emandibulate," cuts but a sorry figure amongst the mandibulate insects; where it seems placed more to eke out the number five, than for any more laudable purpose. The genus *Thrips*, again, although decidedly mandibulate, has been for some similar reason termed haustellate, and placed with the A′phides, &c. It is to be lamented that our publishing entomologists, Messrs. Stephens and Curtis, unhesitatingly adopt these and other glaring inconsistencies.

In the arrangement of the class Lepidóptera, Mr. Newman complains with justice of the carelessness which has been hitherto manifested; authors appearing to regard the insects which compose it as too diversified to be brought under any arrangement which does not abound with anomalies. We have not sufficiently examined his classification to give it our unqualified approbation; but a glance at the diagram will convince the reader that he has not, like some writers, completely set at nought natural combinations.

It would be impossible for us to follow Mr. Newman in the various arguments and facts which he adduces, in behalf of the views he has so forcibly stated. We are quite satisfied that the essay will attract considerable attention among all scientific naturalists; and we cordially recommend it as necessary to the library of every entomologist, especially of those whose love of this delightful branch of natural history extends beyond the mere collection of beautiful objects.

Stephens, J. F., F.L.S.: A Description of Chiasognàthus Gránt*ii*, an Insect forming the Type of an undescribed Genus, with Remarks on its Structure and Affinities.

A notice of this pamphlet (a separate and presentation copy of the article as recently published in the *Cambridge Philosophical Transactions*) is promised us by an able entomologist for the next Number.

Mudie, Robert, Author of "The British Naturalist:" The Botanic Annual; or Familiar Illustrations of the Structure, Habits, Economy, Geography, Classification, and principal Uses of Plants, with Notices of the way in which they are affected by Climate and Seasons; and a short Sketch of Coníferæ. 8vo, with cuts. London, Cochrane and Co. 1832. 15*s.*

We have not had time to examine this apparently meritorious book, but have committed it to the scrutiny of a reviewing friend more at leisure; by whose aid justice will be done it in our next.

Henslow, Rev. *J. S.*, M.A., Professor of Botany, and Secretary to the Cambridge Philosophical Society: On the Examination of a hybrid Digitàlis. From the "Transactions of the Cambridge Philosophical Society." 4to. 1831.

A contribution to botanical physiology of great value and great merit: it will be noticed in detail in some future Number of the *Gardener's Magazine.*

Art. V. *Literary Notices.*

Gould, John, A.L.S., Author of *Illustrations in Ornithology from the Himalaya Mountains*, is about to publish an entirely new work on the birds of Europe. The author, by his prospectus before us, considers that the birds of Europe have been less illustrated, and are proportionally less known, than the birds of other parts of the world. He proposes that his work shall fill up this inequality, and gives the following sketch of his means and terms: —

"Eight years almost exclusively devoted to ornithology, more particularly that of Great Britain; extensive acquaintance and constant communication with the most celebrated cultivators of this branch of natural history; and resources in art beyond those which have already given such universal satisfaction, insure to the author advantages of no common extent. Assisted by experienced collectors at all the most favourable localities, it is intended that the artists employed on this work shall have, as far as possible, a constant supply of living, or very recently killed birds; thus insuring a degree of truth both of character and colouring, which museum specimens, however well preserved, can never supply. All the interesting periodical changes of plumage will be particularly illustrated; and the author hopes to secure for this arduous undertaking that degree of support which its merits and execution will be found to deserve.

"The work will be published in parts, one of which will appear every three months. The first part will be ready on the 1st of June, 1832; and each succeeding part on the first day of every third month afterwards, till the whole is completed.

"Each part to contain twenty plates (their size the imperial folio), fifteen of which will be devoted to the representation of British birds, and five to those of the European continent. The price of each part to subscribers will be 3*l.*, to be paid for on delivery.

"Subscribers desirous of possessing the British birds only, are requested to signify their wishes; and the author, confidently anticipating the support of all the subscribers to the completion of the work, pledges himself, in that case, to a regular and equally perfect performance throughout.

"Only 300 copies will be printed off; and the work when complete will form two interesting and handsome volumes of the land and water birds of Europe. Portions of letterpress, forming together a history of the subjects of the plates, and minutely detailing the habits and manners of all the species, as well as describing and explaining the various changes of their plumage, hitherto so imperfectly understood, will be published occasionally; forming, by the time of the completion of the figures, two volumes large 8vo, which will not exceed 2*l.*"

The Natural History of the Birds of Africa, translated from the French of F. Le Vaillant, with copious notes and synonymes, by Professor Rennie, will be published early in the spring. The work is intended to make two volumes. A translation of Le Vaillant's *Birds of Paradise and the Parrots*, uniform with the above, and with Montagu's *Ornithological Dictionary*, is also in a forward state of preparation.

The Angler's Museum, edited by a member of the Walton and Cotton Club. A printed prospectus of a work to be thus denominated has been issued by Mr. Wood for circulation among the members of the club and the friends of the editor. A copy has reached us, and we have perused it with real pleasure, because it is written unassumingly, clearly, and ably. The author complains that the pursuit of angling has not hitherto been duly accompanied by those correlative considerations in natural history which it is eminently calculated both to excite and to gratify. Besides the acquaintance with the general philosophy of nature to which it tends to introduce us, it leads us, with an almost irresistible directness, to an increased and increasing acquaintance with ichthyology, entomology, botany, and meteorology; and the editor both regrets that the knowledge of these sciences has been hitherto so little coupled with the prosecution of the art of angling, and professes his ardent desire, and we think evinces his ability, if the public will but encourage him to the task, to render this no longer the case. The editor also proposes, as indeed would be expected of him, to collect and collate whatever contributions to improvement, both in the practice of the art and in considerations of science and philosophy connected therewith, the modern school of angling may have developed, and to add these improvements to, and blend them with, all the excellencies of the older school. He will thus perform an acceptable service to all interested in the pursuit of angling; for it is difficult to conceive any thing more annoying than the necessity of procuring and perpetually recurring to numerous books for information on a single subject. This is our feeling; and the welcome patronage the public has latterly bestowed on comprehensive works attests that we are not singular in the possession of this feeling. The editor farther proposes to do what indeed will require superlative familiarity with his subject to do well; it is as follows: — to supply "a bibliographical list and review of all books written either for the improvement in, or that are descriptive of, the art of angling, commencing with the *Treatise of Fysshynge wyth an Angle*, originally printed in the 'Boke' of St. Alban's, and attributed to Dame Juliana Berners, and continued to the last work which has appeared on the subject; combining criticism with copious and characteristic extracts and analyses, and biographical sketches of authors and editors." In the mode of publishing the proposed work, "the form of a magazine has been decided upon."

As worthy the remembrance of our junior readers, and as instancing the editor's style of treating his subject, we present an extract: — "Every one who is acquainted with the habits of fish is sensible of the extreme acuteness of their vision, and well knows how easily they are scared by shadows in motion, or even at rest, projected from the bank; and often has the angler to regret the suspension of a successful fly-fishing by the accidental passage of a person along the opposite bank of the stream: yet, by noting the apparently trivial habits of one of nature's anglers, not only is our difficulty obviated, but our success insured. The heron, guided by a wonderful instinct, preys chiefly in the absence of the sun; fishing in the dusk of the morning and evening, on cloudy days and moonlight nights. But should the river become flooded to discoloration, then does the 'long-necked felon' fish indiscriminately in sun and shade; and in a recorded instance of his fishing on a bright day, it is related of him, that, like a skilful angler, he occupied the shore opposite the sun."

De Férussac, Baron: Histoire Naturelle générale et particulière des Mollusques, tant des espèces qu'on trouve aujourd'hui vivantes que des dépouilles fossiles de celles qui n'existent plus; classés d'après les caractères essentiels que présentent ces animaux et leurs coquilles. This work is resumed; and the author, during the period of suspension, which, he represents, has been most diligently occupied, has prepared livraisons on the Cephalopodes, Pteropodes, and Gasteropodes, several of which are ready for delivery.

Of the *Histoire Naturelle des Mollusques terrestres et fluviatiles* seven livraisons are ready to appear, and will be published in the course of 1832. All who have seen this most valuable and useful work will feel as much pleasure in receiving this information as we feel in communicating it.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Retrospective Criticism.*

Corrections to the last Number.—Neóttia Nìdus àvis. In the mention of this plant, p. 48., for "the leaves of the central root or caudex" (in line 4. from the bottom), read "the base of the central root or caudex."—P. 83. line 20. for "even," substitute "ever." — P. 108. line 17. from the bottom, to the "p." for page, add the figures "85."

Linnæus, as reflected on in Rennie's "Montagu's Ornithological Dictionary." — Sir, On perusing Mr. Rennie's edition of *Montagu's Ornithological Dictionary* a short time ago (noticed in Vol. IV. p. 422.), I was both surprised and vexed to find the editor endeavouring to depreciate the character of Linnæus, whose works should be dwelt upon with admiration and delight, by every person who has made the study of natural history an object of pursuit, or who can set a true value on him who, by the greatest mental and bodily perseverance (combined with no common natural abilities) raised the science of natural history to an elevation it had never before attained. Whatever may have been his defects (and I do not assert that he was infallible), we cannot but look upon him as the founder of a vast system; an index to almost every branch of nature, animate or inanimate, by a reference to which, the object sought for is found named, and classed in regular order, accompanied by the remarks of the author. Before the time of Linnæus, the study of natural history presented comparatively few attractions to the student; he had no book of reference; all was like chaos, and he must either have invented names and classes for himself, or wanted them altogether. When this "rare master-spirit" (to make use of Mr. Rennie's own phrase) appeared, every thing assumed its place in his great volume, and, to the student who lived after him, all was plain; the way had been paved for him, and the study, before laborious, was now rendered comparatively easy.

Mr. Rennie, in making remarks on the Linnæan classification, seems to be criticising one whom he conceives to have devoted his entire attention to the study of ornithology alone, as it is in this department that Mr. Rennie finds most defects, and to which his observations have been particularly directed. Was it to be expected that the all-comprehensive system of Linnæus could be correct in every part? Is it not almost beyond the bounds of possibility that any one man should devote a portion of his time and labour to every branch of natural history, and make each department so correct that no errors could afterwards be discovered. A man who employs his time and talents in the study of ornithology alone, must be expected to have a much more minute and accurate acquaintance with it than one who has applied himself to the more extended branches of zoology. To several eminent ornithologists who lived some years since, and to some of those who are now giving their remarks to the world, we are indebted for improvements in the Linnæan system; but do their observations do more than show that Linnæus had overlooked some of those more minute differences, which in the present day are deemed of greater importance in illustrating some of the difficulties of the science. Many of the names given by Linnæus have been entirely laid aside, and superseded by others, now considered correct, but which, in the lapse of a few years, may be thought as inconsistent with the character of the animals designated by them, as those of Linnæus are at the present day. It must surely be admitted, that the study of ornithology, according to Linnæus, though, perhaps, not so minute as at present, was much more plain and intelligible than that according to the more modern systems; because many are now inventing new names, which they consider more expressive of the character and appearance of the animal than those given by their predecessors. If, for example, I sit down to make out a list of birds, and come to the common or pied wagtail, I must either write the Linnæan name, *M*otacílla álba, the one I have been always accustomed to, and by which I know the bird best, or adopt the one given to it by Mr. Rennie, *M*otacílla lòtor: next year another author may not be content even with Mr. Rennie's name, and may term the bird differently. This system of changing names may be continued year after year, until the original appellation, and perhaps the plainest of all, may be lost in the mazes of more modern nomenclature. While on this subject, I must certainly object to Mr. Rennie's changing the names so much from those in the original edition of Montagu, but more particularly to his making use of provincial and vulgar names, for those expressive of the habits or appearance of the birds. For example, I would ask, in what consists the superiority of the term chickstone to the original one of stonechat; cobb to that of black-backed gull; cobble to that of speckled diver; hay-bird to that of willow wren; boonk to that of little bittern; richel-bird to that of lesser tern; skitty to that of spotted rail; whitwall to that of spotted woodpecker; and many others I could mention. Now, let any person (even one unacquainted with ornithology) compare these names, and pronounce which he should prefer, as being plainer, or by which he would sooner expect to ascertain the birds, and I feel confident that he must concede the superiority to the original. Would any one who had not Mr. Rennie's book at hand know that the cobb signified the black-backed gull, or that by the richel-bird he was to understand the lesser tern?

We have now seen the changes made by Mr. Rennie in the English names of many of the birds, whether for the better or otherwise I must leave to the reader to determine. Let us turn our attention for a little to the Latin names, and contemplate the alterations there. At the head of each description of a bird Mr. Rennie gives the Latin name, included in a parenthesis, immediately after the English or provincial term; and of course we are to conclude that Mr. Rennie considers the Latin name thus selected preferable to all which follow. For the reader's information, I shall point out a few examples, and show the changes he has made: —

Genus *A*nas of Linnæus.	Mr. Rennie's selection.
1. *A*nas spectábilis *Lin.* - - -	Somatèria spectábilis of *Fleming.*
2. Fulígula - - -	Fulígula cristàta of *Stephens.*
3. *Crécca* - - - -	*Querquédula* Crécca of *Stephens.*
4. clypeàta - - -	Spathùlea clypeàta of *Fleming.*
5. *Tadórna* - - -	*Tadórna V*ulpánser of *Ray.*
6. nígra - - - -	Oidèmia nígra of *Fleming.*
7. Maríla - - - -	*Nyròca* Maríla of *Fleming.*
8. glaciàlis - - -	Clángula glaciàlis of *Fleming.*
9. Penélope - - -	Marèca fistulàris of *Stephens.*
10. acùta - - - -	*Dafila* caudacùta of *Leach.*
11. ferìna - - -	*Nyròca* ferìna of *Fleming.*
12. fúsca - - - -	Oidèmia fúsca of *Fleming.*

Here, Sir, we have one genus of Linnæus converted into ten, according to the selection of Mr. Rennie. Which of these systems, I would ask, is it likely a young student desirous of commencing ornithology would wish to take as a standard. Surely not that in which he finds so very great a diversity of names by no means easy of recollection. Will he not rather select that of Linnæus, so simple, and yet so consistent with the character of the birds? It were useless to enumerate more. I might go over three fourths of the birds in our fauna, and find them all, according to Mr. Rennie's book, changed, and, in my humble opinion, not certainly for the better. Many of those which Mr. Rennie has thought proper to alter have met with the approbation of several eminent naturalists, and among them of none more capable of judging of their propriety than Mr. Selby, who has made the department of ornithology his almost exclusive study, and, by his accurate investigation, has contributed so much to elucidate that branch of natural science. Surely, the simpler a system is, the more likely it is to find advocates, and the more extended will be its circulation. It is not by the infinite subdivision of classes, and multiplication of genera, that the study of natural history is to be advanced; the less we encumber our system with divisions, unless with such as are absolutely necessary, the more easily will it be recollected by the student, and the more leisure will he enjoy for studying the manners and habits of those animals to which he may have directed his attention; and which he should make his principal aim, in studying any branch of zoology.

But I do not wish to take up the pen of a critic. My object has been, not to furnish you with a review of Mr. Rennie's edition of Montagu, but to vindicate the character of a great man, which I could not but consider unjustly aspersed. It demands not the operation of first-rate talents to detect a fault in the design of the most magnificent and best constructed edifices; the works of the most celebrated architects have not escaped the censure of vastly inferior artists; but no one would desire on that account to detract from the reputation of those great masters of their profession. If this observation be true with respect to those arts which can be placed more immediately under the eye of the artificer, and are with such facility submitted to his correction, how much more forcibly may we not apply it, in defence of the great Linnæus, who had to explore his path amidst all the snares and labyrinths of a science which the false speculation and erroneous theories of his predecessors had conspired to render more intricate and uninviting!

I do not apprehend that I shall meet with contradiction when I assert, that Linnæus has anticipated our progression by at least two centuries. It is impossible to pronounce with any degree of certainty in what state the science would have been found at the present day, had the brightness of his genius not shone upon the obscurity in which it was involved. He laid the foundation, I might almost say, of practical natural history: but his indefatigable spirit did not rest there; he prosecuted his labours with unremitting perseverance, and set an example worthy of being followed by every lover of natural history. Yours, &c. — *J. D. M.*

The Kingfisher at Bury St. Edmunds. — Observing (Vol. IV. p. 275.) that the kingfisher occurs only in winter in a part of Yorkshire, and in other places only in the summer, I beg to amend my account (Vol. IV. p. 450.) of its occurrence here, by stating that the kingfishers remain about Bury St. Edmunds all winter certainly, and I even think they are more numerous in winter than in summer; although they have, I think, been more abundant than usual this summer. — *Henry Turner. Bury St. Edmunds, October* 17. 1831.

Influence of Rocks upon native Vegetables. — Dr. A. Murray of Aberdeen has, in Jameson's *Journal* for June, 1831, made some remarks on our correspondent Mr. Thomson's paper, "On the Relations subsisting between Strata and the Plants found in their superincumbent Soils." (Vol. III. p. 410.) After a variety of observations relative to districts which he has examined, he arrives at the conclusion, that "it may be laid down as a rule, that vegetable species are not limited and determined by the subjacent rocks; but to this there may be a few exceptions. Thus, it is certain that plants must be affected by rocks which influence the moisture of the soil; and, considering the peculiar and energetic properties of lime, it is not an improbable guess that it may be eventually established that certain plants are confined to the limestone rocks." The question as to the relations subsisting between soils and plants, Dr. Murray acknowledges to be a subject far more difficult than the influence of rocks on plants. He does not discuss this subject; but he says, " In all probability, the native plants of any given region will, when other circumstances are equal, grow and prosper in any soil, some exceptions being necessary, chiefly on the score of moistness."

" The limiting of certain vegetables to certain soils is favoured by no analogy which can be drawn from animals, who live and prosper in nearly all regions."

Vegetables in a state of cultivation, and especially those cultivated for particular parts, as the root, fruit, &c., may be favoured by circumstances in the rock and soil, that do not influence native uncultivated species, which alone form the subject of these remarks. From all that we have been able to observe and to read on this subject, we are inclined to conclude that climate has a much greater influence on plants than either rocks or soil. The geological circumstances of the earth's surface cannot be materially different in every zone, and yet the plants are materially so.

Dr. Murray's article occupies nearly ten pages; and, although published in June, is dated January 19. 1831. Strictures on Dr. Murray's first article, and on Mr. Thomson's remarks on it, as given in our Vol. III. p. 410., occur by Causidicus (Vol. IV. p. 460.), headed " Geological Relations of Plants." These strictures we received on January 7. 1831, and regret that we omitted the date at the close of the article. As they were written prior to Dr. Murray's second article, and we did not publish them till September last, it is probable that they have not yet met Dr. Murray's notice. — *Cond.*

Changes in the Habitats of Plants. — Sir, The interesting remarks of your correspondent Mr. Lees (Vol. IV. p. 437.), in which he appears unable to account for the changes in the habitats of plants, have induced me to offer a few observations, which, I trust, will cause somebody of greater experience to take our hopes and fears into consideration, and give an explanation satisfactory to us both. It appears, even from Mr. Lees's own showing, that the loss of rare plants from particular places must, in some measure, be attributed to enclosure and cultivation; but, I fear, the hands of numerous collectors must also be blamed for their entire removal from well-known habitats. On the other hand, Mr. Lees says, " beautiful plants occasionally rise up in stations where they were before unknown." It may be some consolation to prove that this is also caused by cultivation; and, therefore, I trust we not only run no risk of losing old favourites, but that, as long as any waste land remains to be ploughed up, we may look forward to new plants discovering themselves. I am led to hope this from the following circumstance: — A friend who had been in the habit of peeling turf from a hill for his lawn and garden, remarked to me that, at whatever time of the year this was done, plants of various kinds sprang up, when it was scarcely possible the seeds could have been sown there after the turf was out; and, consequently, I imagine they must have lain in the soil an unknown time. Perhaps some one of your correspondents better acquainted with the subject, will be able to inform me what time it is probable seeds will remain in the ground without vegetating; if, as in this instance, they were prevented by a thick coating of grass, with its matted roots, through which, I understood, the plants were not accustomed to force their way. I am, Sir, yours, &c. — *J. A. H. Oxford, Sept.* 17. 1831.

Ascent of the Sap. — Sir, In Vol. IV. p. 542. is an ingenious theory of the ascent of sap in trees, by H., as follows: — " The theory I wish to prove is the following: — The sap in its ascent in the stem becomes deprived of some of its constituents, more especially of its aqueous part; this deprivation is effected by the vital principle of the plant decomposing the aqueous parts, and assimilating the resulting gases to its own constituents. As the assimilation takes place a partial vacuum is formed by the change of gases to a solid form, and this vacuum is immediately filled with sap rushing into it, according to the well-known law of the tendency of fluids to rush into any cavity deprived of the presence of air."

This theory would be very convincing, but for one circumstance; namely, for once, that is to say, for the first time, the sap must rise into the upper part of the tree, there to be "deprived of some of its constituents," owing to some other cause than the one proposed in the theory of H.: when once it has risen then H.'s theory would account for its continuing to ascend.

What I want H., therefore, to explain is, what is the cause why the sap rises in the first instance into the upper part of the stem? What impulse forces or drives it up primarily, in order that, when it has ascended, the process of assimilation, &c., vacuum, and renewed supply, may take place in the manner his theory supposes.

When H. has given us that information, I shall rest satisfied. This, however, cruel as it may be, will most likely throw H.'s theory overboard; as it occurs to me that the cause which produces the first rise of the sap will suffice to account for its subsequent ascent. In plain English, although I fully admit the ingenuity of H.'s theory, I feel confident it cannot be the true one; as the sap must have ascended once before his system can come into play. Yours, &c. — *Thomas Thompson. Hull, Nov.* 9. 1831.

Relative Scarcity of certain Species of British Plants, Changes in their Habitats, and Introduction of Exotic Species into British Localities. — Sir, The remarks of Mr. Lees (Vol. IV. p. 437.) relative to my notice (Vol. IV. p. 28.) of *Iˋris* tuberòsa as a native of Ireland, induce me to add a word or two of explanation on that subject. Mr. Lees is a practical and intelligent botanist, and I do not wonder that he should be a little sceptical on the point in question. All that I positively contend for is, that this *Iˋris* has as strong claims to be considered a native of Ireland as many other plants which are admitted into our indigenous list. The plant is undoubtedly of exotic mien and aspect; and the circumstance of its being met with near a large town, and in the vicinity of an old ruin, which Mr. Lees justly considers as casting a degree of doubt on its claims as a genuine native, had previously occurred to my own mind, and created the same suspicions. Should these remarks meet the eye of Mr. Drummond, to whom I am indebted for having introduced me to the Irish habitat of *Iˋris* tuberòsa, he possibly might be able to throw some additional light on the subject. I entirely concur in all that Mr. Lees advances about the botanical or horticultural propensities of the monks in olden time; and admit the propriety of his remark, that "when we find any rare plant on, or in the neighbourhood of, a ruin, we ought to be very suspicious whether the plant is not a naturalisation, rather than a real denizen." Our Hibernian *Iˋris*, accordingly, may possibly have been introduced. I do not think, however, that its introduction has been a fraudulent one, or that it is of recent date; and at all events the species has now become naturalised, and therefore, as I have already remarked, has as fair a claim as many other plants to a place in our British flora. There are, I believe, those who contend that *A´rbutus U´nedo*, which grows so abundantly on the rocks and islands of the romantic Lake of Killarney, is no original native, but has been introduced to that station by the monks of Mucruss. Be this as it may, whoever has seen the shrub luxuriating as it does in the wild district of Glyngaraff, near Bantry Bay, can hardly doubt its being truly indigenous.

Mr. Lees's observations (Vol. IV. p. 437.) on "The relative Scarcity of certain Species of Plants, and on Changes in their Habitats," are, it strikes me, so just, and full of interest, that I may be excused, perhaps, for following him a little more in detail, and adding to them a few corresponding remarks of my own. And here I must candidly avow, that, like Mr. Lees, and some few other of your correspondents, I am no friend to the practice, whatever may be said in its defence, of scattering the seeds of exotic plants among our wild woods and rocks, whether this be done "for the purpose of astonishing the traveller, or hoaxing the scientific collector," or (as I have, ere now, heard it strongly suspected) in order that the very person who sowed or planted the species might afterwards find it again, and take to himself the merit (such as it is) of being the discoverer of a new and rare native plant. In this latter case the practice is worse than childish; it is truly a botanical fraud in the most offensive sense of the term, and a pitiful falsifying of natural history. "The garden," says Mr. Lees, "the plantation, and the pleasure-ground, are the proper places for the exhibition of the effect of man's sportive and improving hand; but let us leave the woods and rocks to their native wildness and magnificence, as long, indeed, as the advance of population allows us to retain any wilds at all." I may add for myself, that the choicest double rose or show tulip would, in my eyes, be at best but an impertinent plant, when met with introduced in our British woods and mountains. Every botanist, every lover of Nature as she is, will participate in the feelings which Mr. Lees expresses in the following passage: — "Last week I passed through a wood covering one of the transition limestone hills, near Ledbury, which was most profusely ornamented by the beautiful *Vícia sylvática* *, festooning the trees on all sides. I was delighted in the extreme at this wild production of nature, so strikingly lovely: but had it been in the power of any person to have informed me that some ornamenter of wilds had been profusely sowing the plant in the wood, my pleasure would have been much abated, nor could I have in that case concluded that a calcareous soil was the natural home of the plants." By far the largest and most luxuriant specimens of *Mímulus lùteus* I ever saw, so much so, indeed, that they made quite a splendid and magnificent show, were growing on the boggy margin of a mountain rill, not more than a mile or two from Abergavenny. But as I did not for a moment suppose that the plant was a native in that situation, or any other than introduced by the hand of man, the sight, brilliant though it was, did not afford me that pleasure which the discovery of some truly indigenous, though far less conspicuous, botanical rarity would have done.

Mr. Lees informs us that "*Saxífraga umbròsa* may now be found on some of the rocks at Malvern;" but he very properly assigns to it a garden origin. Some years since, while touring in Yorkshire, I was at no small pains in endeavouring to meet with this plant in a truly wild state, and with this view visited the spot (Hesleton Gill) so minutely pointed out as its habitat in *English Botany* (see pl. 663.). The result, however, of my examination was only an increased doubt as to the species being even in this sequestered spot really of spontaneous growth.* It has been confidently asserted that the species occurs wild in Ireland; but erroneously, I believe; unless, indeed, the discovery has been made of late years. The "London prides," which grow unquestionably wild, and so profusely adorn the rocks and mountains of Kerry (e. g. the Gap of Dunloe, and the rocks near Killarney), are not *S*axífraga umbròsa, but some allied species, be they two (*S. G*èum and hirsùta?) or more, with their perplexing host of endless varieties. And I very much doubt whether any truly wild habitat for *S*axífraga umbròsa be yet known either in Ireland, England, or even Scotland; or, indeed, whether the plant be in fact originally indigenous. Ireland is the proper country of Robertsòn*iæ*, by which name the London pride family of the genus *S*axífraga is now distinguished. In some parts of that country they grow in astonishing profusion; but among all the countless varieties which are to be met with, I never could see, in a wild state, any one that could be mistaken by a botanist for the true *S*. umbròsa.

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* Why is not this beautiful climber (certainly one of the most charming and elegant of our native plants) more frequently cultivated in the garden? Is it on account of any peculiarity of the soil which it requires? or the difficulty of making it succeed in a state of cultivation? It generally prefers a chalky or calcareous soil; thus I have observed it in beautiful luxuriance in the neighbourhood of Clifton and Bristol, also in the vicinity of Oxford, and lately near Dover. But it also occasionally occurs in a light sandy soil, as, e. g., in Bentley Park, near Atherstone, in this county. I have more than once sown the seeds in the garden, and seldom succeeded in making them come up, or at least in raising them to perfection. What is the cause of the failure?

Valeriàna rùbra Mr. Lees considers, and with great probability, as another "insinuating emigrator," of foreign origin, but now become naturalised. Till lately I never met with it but in suspicious situations, as, e. g., on some city wall, or "old ruin," &c. During the last summer, however, I observed it apparently wild about the chalk-pits, by the road-side, near Dartford, in Kent, and again on the cliffs by the sea-side at Ramsgate.

As to the relative scarcity of plants, i. e. their rarity or abundance relatively to different parts of the country, I will refer but to a few instances out of an immense number that might be mentioned. Of those nòticed by Mr. Lees, Adóxa Moschatéllina is abundant in this parish, growing on moist banks, and the margins of brooks; *C*otylèdon Umbìlicus I scarcely recollect to have seen in this county, save on the ruins of Maxstoke Priory, and there but sparingly; while in some parts of Somersetshire and of the county of Wicklow, as well as in many other places, it is exceedingly abundant on walls and banks. It must be near thirty years ago that I once saw gathered a single specimen, and that a weak one, of *L*ycopòdium *S*elàgo, and also of Osmúnd*a* regàlis, in the bog below Coleshill Pool (see Purton's *Midland Flora*, where the above habitat is inserted on my authority). But repeated search has never subsequently been rewarded by another specimen of either plant in that situation. *A*splènium lanceolàtum, one of the most elegant of our British ferns, I never saw alive, and could only with difficulty obtain a dried specimen of it, till I visited Penzance. There it occurs profusely, springing out of every wall, and under every hedge-bank.

True botanist-like, Mr. Lees seems to regret the ravages which are committed on our native flora by agricultural improvements, roadmaking, &c. And it must be confessed that, owing to the march of civilisation, some of our rarer plants, and, I might perhaps add, insects also, have wellnigh become extirpated from various parts of the country. A pit in this parish formerly abounded with Aspídium *T*helýpteris; the entire surface was so completely scummed over (if I may be allowed the expression) with a thick blanket of the matted roots of the fern, interspersed with *S*phágnum, *C*ómarum palústre, &c., that no water was visible; and, more properly speaking, the spot should not be called a pit, but a shaking bog. Some years ago the field was brought to the hammer, and purchased by an industrious hard-working man, who, at no small expense of labour, drained the bog, and converted it into profitable ground. Of course there was an end to Aspídium *T*helýpteris in that situation; nor do I at this moment know any other habitat where it is to be found. I could mention also the case of a charming boggy meadow, on the skirts of Chemsley Wood, near Coleshill, abounding with Pinguícula, Drósera, Parnássia, Erióphorum, Oxycóccos, Epipáctis, &c., and the breeding-place, too, of Hippárchia Galathæ'a, and of the far rarer Melitæ'a A'rtemis, in short, one of nature's own botanical gardens, which has long since shared a similar fate with the pit of Aspídium Thelýpteris, in this parish. I was delighted with this spot in my youth, and have spent many an hour in exploring its natural treasures. The last time I saw it I was attended by a botanical friend, who accompanied me for the purpose of being introduced to a place where he might collect bog plants for cultivation in his garden; when, to our surprise and mortification, we found the whole meadow, the former residence of such plants as Narthècium, Triglòchin, &c., converted into a prolific potato-ground. But it is not only to the cultivation of waste lands, and to agricultural improvements, that the extermination of some of our rarer plants is owing; it may be attributed, also, in part at least, to the rapacity of botanists and collectors, who in some cases too greedily pluck up, root and branch, every specimen of a rare plant they can meet with. It is owing to this cause, in great measure, that the beautiful Cypripèdium Calcèolus (that prince of British Orchídeæ) is now, I believe, scarcely to be found in the wilds of Yorkshire.

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* See Haworth's *Saxifrageàrum Enumeràtio*, p. 55., and preface, p. xiv.

Though my remarks have already extended to a much greater length than I anticipated, I cannot conclude them without briefly reverting again to the subject with which they commenced. Last autumn, about the time that I communicated the notice of I'ris tuberòsa, I procured some roots from the friend's garden before alluded to, where (as I have said) the plant thrived and bloomed so well. These roots were strong and vigorous, and apparently gave every promise of flowering in the ensuing spring. My friend, indeed, selected such as she said she was confident, from the thickness of the shoots, would produce blossoms. These were planted in my garden, and fenced during winter from the severity of the frost by some dry fern. There, however, they produced no flowers. The failure, you will at once be ready to suggest, was owing to the removal of the roots; and possibly it might be so. In the spring I paid a visit again to my friend's garden, expecting to see the I'ris, as heretofore, with some twenty or thirty blossoms in full beauty; but, strange to say, though no alteration in the mode of culture had been adopted, not a single flower was produced there, during the season, from patches of the plant which previously, for seven or eight years, had flowered so copiously. What was the cause of this failure, and how it is to be remedied, I am at a loss even to conjecture, and should be glad to be informed. In superstitious times it might, perhaps, be said, that the spirit of the I'ris was affronted at my interference, and withheld its blossoms in disapprobation of the liberties which I had taken with it. And in truth it must be considered as a most capricious plant as regards the display of its sombre charms. But enough; as I greatly fear the above may be deemed a dry and tedious discussion by the majority of your readers. To the congenial mind of Mr. Lees it may not, perhaps, prove uninteresting. To that gentleman my thanks are due, for the handsome manner in which he is pleased to speak of my contributions. Yours, &c. — *W. T. Bree. Allesley Rectory, October* 27. 1831.

I'ris tuberòsa is a Native of Cornwall, on the following evidence: — Mr. Arthur Biggs, curator of the Botanic Garden, Cambridge, received, about four years ago, tubers of a plant from a brother of Mr. Goode's, St. John's Street, Cambridge, which were obtained in Cornwall, and near the sea; and Mr. Biggs was informed that these tubers were of a plant that is plentiful and wild in that neighbourhood, but where nothing is known of its name. These tubers, on being planted, developed plants of I'ris tuberòsa, past all question; for, although they have not yet produced flowers, *I.* tuberòsa is, I believe, the only species of plant, out of the several thousands which our gardens contain, that possesses four-edged leaves, and this character is duly obvious in the leaves of the plants in question. The address of Mr. Goode's brother is, "Mr. E. Bell, No. 70. Portland Square, Plymouth;" by a post-paid letter to whom more definite particulars may be learned.

To blossom *I'ris* tuberòsa satisfactorily, do thus:—Let it stand two or three years in succession in the same spot; then, and oftener if you wish to increase it, dig up its tubers as soon as its leaves, by turning yellow, indicate its growth finished for the season: this will be usually in July. Divide the tubers all you please, for even small fragments of these will produce plants; but just in proportion to the smallness of the divided portions will be the time occupied in their acquiring sufficient vigour to produce blossoms. The tubers are shrivelled and weakened by being dried, being very far less patient of drying than bulbs of crocus, tulip, and hyacinth. Divide them, therefore, as soon as dug up, and replant them immediately, 6 in. deep, in a compost formed of half friable loam and half leaf mould or old hot-bed dung rotted to the consistence of soil. Let the situation be a dry bed or border at the base of a wall, with a southern aspect, and plant the tubers close to the wall, or only at a few inches from it. Thus treated, *I'ris* tuberòsa, in the Botanic Garden at Bury St. Edmunds, every spring exhibits its peculiarly coloured and constructed and delicately fragrant flowers, and occasionally also produces seeds: these, if sown the moment they are ripe, produce plants which flower in the fourth year of their age. One observance in the cultivation of this plant should be absolute; never to stir the soil within a foot of it after the 1st of September, for it will by this time have commenced the emission of roots for the imbibition of the requisite energies for its next year's flowering, although it may not send its foliage above ground to tell you so until even November. This last remark applies to most, perhaps all, hardy bulbous plants, and to many hardy tuberous plants: but this is gardening.

The figure of *I'ris* tuberòsa in Vol. IV. p. 29. fig. 9. is admirable in its general outline, but does not portray the peculiar four-edged character of the foliage, and the plant has, I believe, never such a scaly creeping sucker at its root as is there represented.—*J. D.*

Reply to the Remarks by Sir Richard Phillips on Sir J. Byerley's Theory which accounts for Geological Phenomena by the Precession of the Equinoxes.—Sir, Your last Number contains (p. 102.) a testy article by Sir Richard Phillips against his former "correspondent," myself. I am sorry to have disturbed the philosopher's bile. In attributing to him the priority of an important discovery, I confess I purposely strained a point in favour of an old and worthy servant of the public whom the world has used unkindly. He says I have not read his work. I should be ashamed to own that I had not, as he presented me with each successive modification of his infallible doctrines. Alas! I had to do more than read it; for on the titlepage of his last present he wrote, "Lend it to Count Lanjuinais and Benjamin de Constant." Lending was not enough: I was called upon to explain it to those two friends of mine, to whom I had introduced Sir Richard; and I was obliged to confess, with the members of the French Institute, that there was very little of it I could understand, having the misfortune to believe in Newton and "attraction, gravitation, and other superstitious fancies," which Sir Richard has blotted out from his creed.

As to his real theory, he has laid it before your readers; and far be it from me to prevent his making one proselyte. Mine, too, or rather that of Hipparchus, applied by M. Guesney and myself, is also before the public. Innumerable phenomena are capable of a rational solution by it; but I am no dealer in infallibilities, like my quondam friend, Sir Richard, and I therefore point out in an article sent herewith (p. 172.), an easy method for astronomers to decide definitively on its truth or falsehood, by direct observation, at the approaching equinox. I am, Sir, yours, &c.—*J. Byerley, Jan.* 15. 1832.

Art. II. *Queries and Answers.*

The Rot in Sheep; what are its Causes?— Dr. Brown (p. 98.) appears to doubt the possibility of sheep becoming jaundiced except by the obstruction of the ducts of the liver, and conceives it cannot be demonstrated that bile is thrown back upon the system: for in the early stages there is no obstruction to the bile; and in the latter, what little is secreted is intercepted by the flukes. Dr. Brown is, doubtless, aware of the difficult pathology of the liver, but cannot be a stranger to the facts that jaundice is produced by derangement of the bowels alone, by inflammation of the lower portion of the right lung, by inflammation of the liver itself, and that sometimes only a small portion, &c. &c. The present state of science appears deficient in the production of facts to disperse the obscurity of the causes of jaundice in every case; although in the present, I think, there is not any difficulty, jaundice being produced by the absorption of bile into the circulating fluids, and without the obstruction of any foreign body. I think that the tinge of yellow, or jaundiced appearance of the eyes, is really the first and earliest symptom (generally speaking) " which guides the shepherd to the unwelcome truth." The " peculiar whiteness of the eyes " is only secondary, as the following fact will prove: — A large flock of sheep, the whole of the summer of 1830, ran in a dry forest pasture; they had every appearance of health, and were in excellent condition. In the autumn, an indiscriminate part of them were turned into a meadow pasture of luxuriant growth; and in a short time the shepherd observed that some of them had become listless, and had lost their usual vigour and activity; that they eat but little, were generally lying down, and that their eyes were dim and yellow; and that these sheep were not so soon roused by the accustomed summons of his dog as those which had not yet felt the change of pasture (as he expresses it), and whose constitution was stronger. They remained in this state from fourteen to twenty-four days; and the yellowness of the eyes, in the course of this time, gradually decreased, and at length became of a pearly white. The whole of this part of the flock went through the same symptoms, while those sheep which remained upon the dry forest pasture continued in perfect health. Examining the liver of one about six weeks after the change of pasture, it was found to be increased in size; and in various parts to be studded with small tubercles, varying in size from a mustard seed to that of a pea, of a dirty yellow colour, and of the consistence of curd or soft cheese, and with a few flukes (Fasciola hepática) in some of the ducts; in the liver of another of the sheep there was an abscess containing about 4 oz. of matter, and in that also only a few flukes. I might multiply cases, but my chief object is their application to practical utility; and my particular enquiry is, " What are the causes producing so destructive a malady?" If, as I have stated (Vol. IV. p. 472.), it is the loss of the stimulating qualities of the grass, arising from the quickness of its growth, that produces derangement of the chylopoietic viscera [chyle-secreting organs], this, the first step in the disease, is of primary importance; and the simple remedies are, the removal of the sheep to a drier pasture and stronger food, and giving a few doses of saline aperients, with any bitter infusion, as a stimulating tonic, and mild mercurials to promote the secretion of bile. I wish it to be perfectly understood that this is not for the destruction of the flukes; nor do I think, in the early stage, any are found in the liver. To know the cause producing disease I consider of the greatest importance, particularly in the present instance, as such varied and absurd opinions on it are entertained by the farmers themselves; and until the cause is pointed out, they will continue to expose their flocks to the exciting cause, from the want of knowing better. — *D. N. Worksop, Jan.* 17. 2.

Habits of the long-legged whistling Ducks, and of the Sheldrake. — Sir, In Vol. IV. p. 474., Mr. Swainson asks information of the habits of the long-legged whistling ducks of the West India islands; and of the sheldrake (*Ánas Tadórna*). Of the first, Mr. Swainson omits giving the scientific name; I, therefore, cannot decide to what bird he alludes: but a friend of mine lately made me a present of a pair of ducks he brought from Jamaica, that are decided *whistlers*, as they whistle to one another for an hour together; that is, they used to do so, until a fox *whistled* off the drake a night or two ago, who would be gay and sleep out at nights; and his widow now consorts with the turkey-cock, perching every night on an open veranda against the house, about 7 ft. from the ground. These ducks are very large birds, but not long-legged, and are neither more nor less than very fine Muscovy ducks; but such as they are, Mr. Swainson is quite welcome to the description of them: and, if he will pay me a visit, he may try the flavour of them. As to the sheldrake, I am expecting to receive some from Lincolnshire, which were faithfully promised to be procured for me; and if I succeed in having them, I will not forget to note down every thing remarkable that I observe in them, for Mr. Swainson's benefit. I am, Sir, yours, &c. — *A Subscriber. Southampton, Dec.*, 1831.

Whirls of the Tumbler Pigeon. — I am obliged to Mr. Swainson for his early attention (Vol. IV. p. 557.) to my enquiry (Vol. IV. p. 473.) on this subject. In reply to his recommendations, I have to inform you, that I am certain that "the movement is common to both sexes," as I have often amused myself with watching the alternate pranks of a single pair; that "it is done at all seasons," and not at particular seasons, such as incubation, &c.; for at that time the male bird covers the eggs by day, while the female takes charge of them at night. I agree with Mr. Swainson in thinking the movement indicative of pleasure or excitement; as I can fancy that the feeling that causes it is the same as that which prompts a man to rub his hands together with delight. Since the discovery of the Colúmba arquàtrix (I think, by M. de Vaillant), the domestic tumbler has acquired an importance, at least in my mind, which naturalists have hitherto denied it. All writers on natural history, in their classifications, have declared the varieties of the Colúmba doméstica to be derived from one stock, the C. rupícola, or rockier. M. Temminck ridicules Buffon's idea of all the foreign varieties having the same source; but I think Buffon's theory just as probable as that the domestic tumbler has any connection whatever with the Colúmba rupícola. If it has, why do not other varieties of the Colúmba doméstica occasionally tumble? and why is the practice confined exclusively to this variety, which, unless bred pure, loses the propensity: and now it appears there has been lately discovered a wild species that has the same propensity, or at least something very like it. Is it not probable that this bird may be a descendant of the newly discovered species, its propensity to tumbling being increased by domestication? — *A Subscriber. Southampton, Dec.*, 1831.

A Swift (*Cýpselus muràrius* Temminck) *killed by its flying against a Wall.* — Sir, Some few summers ago, being on a visit at Hastings, I stopped, during an early morning's walk, to watch a party of swifts (Cýpselus muràrius *Temm.*, Hirúndo Ápus *Linn.*) dashing round the ruins of the old castle which overlooks the town. While I was thus amusing myself and admiring the extraordinary rapidity of their flight, to my infinite astonishment one of them flew directly against the castle wall. My surprise was so great that at first I thought I was mistaken; but as the spot where the bird fell was not very difficult of approach, I climbed up, and there found the bird fluttering on the ground. I picked it up, but in a very few minutes it died in my hand. I pursued my walk, marvelling at the oddness of the adventure, not knowing to what to attribute so strange an accident. It could not be that the bird, in its eager pursuit of prey, miscalculated the distance, and thus met death? this was just possible, but not very probable. Blindness was out of the question, as both eyes seemed perfect. I was thus completely puzzled. Thinking over the affair some time afterwards, a more satisfactory solution of this ornithological problem occurred to me. It is well known that this bird, I believe, more particularly than the rest of its congeners, is infested with the insects called Hippobósca *H*irúndinis; I have, therefore, but little doubt that the poor bird, in a paroxysm of suffering, occasioned by these tormenting insects, dashed itself unheedingly against the wall. I am the more confirmed in this belief by recollecting that several small reddish insects ran about my hand at the time I held the bird. I shall feel much obliged if you, or any of your correspondents, would favour me with an opinion on the subject. — *O. Clapton, Nov.* 1831.

I recollect having found *H*irúndines alive on the ground thrice in the course of my life: the first (when a schoolboy), *H. A'*pus, on longish grass, in a village churchyard; the second, *H.* rústica, long after, on a flower-border at the foot of a 10 ft. wall; the bird being partially hidden by the plants which grew in the border. Both of these, on being elevated in my hand, flew away: the second, however, but feebly, and for only a short distance. The third was, I am pretty certain, a martin (*H.* úrbica), which I found six or seven years ago, also at the foot of the wall above named. On examining it closely, I soon discovered the cause, without question, of its forlorn condition; viz. three luxuriant individuals of the swallow tick (Hippobósca *H*irúndinis), which ran so nimbly, and played at hide and seek so dexterously among the feathers of the bird, that I had some difficulty in securing them. The bird was afterwards set down on the ground to take its chance. These ticks were not, however "small and reddish," as O. describes his to have been, but rather large, and tinged with a bluish green hue: disagreeable objects, but singular in their lanceolate wings. It is possible, and perhaps probable, that the two first-named birds were, from a similar cause, driven in despair to rest on the earth. — *J. D.*

The Creeper (*Cérthia familiàris*) *resident, not migratory, in Lancashire.* — In reply to W. H. White's query (Vol. IV. p. 473.), I have to state that it remains here the whole year. Specimens are numerous in this neighbourhood, but are not in winter so frequently observed as they otherwise would be, in consequence of their often associating at that time with the different species of titmouse; and using the same call-note, which is very different from that used by them when they are in single pairs, as is the case when they are not in company with the titmice. But they are most frequently seen in company with the ox-eye (Pàrus màjor), the blue (P. cærùleus), cole (P. àter), and marsh titmouse (P. palústris), which associate in small flocks, and use the same call-note as if they were all of one species. — *T. G. Clitheroe. Lancashire, Jan.* 17. 1832.

The Creeper (*Cérthia familiàris*) may be occasionally seen in the southern counties throughout the year. I never heard that it was even thought to be migratory. — *Edward Newman. Deptford, Sept.* 19. 1831.

The Creeper (*Cérthia familiàris*). — Mr. White asks (Vol. IV. p. 473.), is this bird migratory or not? As a contribution towards an answer, I beg to say it is by no means uncommon in this neighbourhood during summer; but of it in winter I can only say that I saw one shot here either in the end of December, 1830, or early in January, 1831. — *Henry Turner. Bury St. Edmunds, Oct.* 24. 1831.

In Kensington Gardens this bird may be seen through the winter. I saw it there in the middle of November, and in the end of January, 1832. At both times it was most diligently occupied in entomological research: in the first case it was exploring the bark of a tall acacia tree (Cobbett's locust tree, Robínia Pseud-*A*càcia *L.*). The surface of the trunk of an acacia tree is very uneven, exhibiting deep irregular longitudinal grooves, besides the prevalence of chinks in the bark, as is common to all trees, but which chinks in the bark are themselves deep in the acacia, perhaps more so than in most trees. Both grooves and chinks, however, the creeper can well enough explore by virtue of the length of its bill (in Montagu's *Dictionary*, "half an inch;" is it not slightly longer?); and the elegant attenuation of its mandibles, and the acute points in which they terminate, enable it easily to take the smallest insects. An adaptation of structure to function is herein perceptible; and, if I rightly remember, Mr. Yarrell has told me that the breast-bone of this bird has little or no keel, to the end that its climbing habits may not receive the impediment which a prominent keel would occasion. — *J. D.*

Ornithoscope (p. 83.). — Is this a newly invented instrument, possessing peculiar optical powers; or is it but a new name for the common telescope, expressive of the ornithic scope to which the telescope is applied? — *D. S. Jan.* 26. 1832.

The Polyómmatus Argiolus (*Azure-blue Butterfly*) *is double-brooded.* — Sir, Mr. Bree asks (Vol. IV. p. 477.) if this is a double-brooded insect; and Mr. Jordan answers (Vol. V. p. 109.) in the affirmative. I think he is right. I have seen, both in the spring and autumn, what I consider the same species; and should I have an opportunity of observing it this year, I will preserve some specimens at both seasons. About five miles east of Cambridge, in a low meadow of coarse grass, adjoining a shrubbery, and bordered by a rivulet, I saw this butterfly, about the end of August, 1830, in great numbers. In the spring of 1831, I saw it in the same situation, though much less numerous; but in the autumn of that year, I passed several times without seeing a single specimen; and I conclude I was either too early or too late for it. Mr. Bree speaks of the caterpillar feeding upon holly and ivy; but there was, I believe, neither of those trees in the neighbourhood where I saw the butterfly. *The Butterfly Collector's Vade Mecum* says it feeds on grass; and from the situation in which I saw it, I am inclined to think that statement correct. I am, Sir, yours, &c. — *E. Ventris. Cambridge, Jan.* 25. 1832.

Humming in the Air. — Sir, The humming spoken of by your correspondent O. (Vol. V. p. 110.), I have no doubt, proceeded from the common gnat (Cùlex pipiens). I have frequently heard (at first with surprise) the noise he speaks of, when the authors of it have been invisible. At other times I have heard exactly the same sound; and looking upwards for some time, I have just been able to see the van of an army of gnats. The supernatural music in the air, described by superstitious villagers, must be attributed to the same cause. Kirby and Spence (*Introd. to Entom.*, vol. ii. p. 377. 1st ed.), alluding to the passage in White's *Natural History of Selborne*, remark: — "The hotter the weather, the higher insects will soar; and it is not improbable that the sound produced by numbers may be heard when those that produced it are out of sight." The gnat has long been celebrated as a trumpeter. Homer, in his *Batrachomyomachia* [Battles of the Frogs] says: —

> Καὶ τότε κώνωπες μεγάλας σάλπιγγας ἔχοντες,
> Δεινὸν ἐσάλπιζον πολέμου κτύπον.
>
> ——— "Huge[*] *gnats*,
> Through clarions of unwieldy length, sang forth
> The dreadful note of onset fierce." *Cowper.*

And Spenser, in his *Faery Queene* (b. ii. c. ix. 16.), says: —

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[*] The epithet *huge* is a volunteer of the translator's; and *μεγάλαι σάλπιγγες* is used from the *great sound*, rather than the *unwieldy length*, of their instruments.

" As when a swarme of *gnats* at eventide,
Out of the fennes of Allan doe arise,
Their murmuring small trompets sounden wide;
Whiles in the aire their clust'ring army flies,
That as a cloud doth seeme to dim the skies."

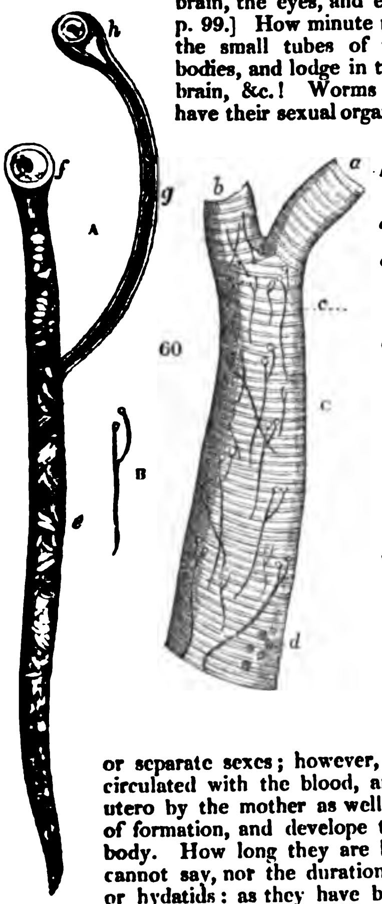
— *E. Ventris. Cambridge, Jan.* 25. 1832.

In Insect Transformations it is the Tail of the Caterpillar which becomes the Head of the Butterfly. — I have lately observed a curious fact, which I have never seen noticed in any book which has fallen in my way, viz. that it is the tail of the caterpillar which becomes the head of the butterfly. I found it hard to believe till I had convinced myself of it in a number of instances. The caterpillar weaves its web from its mouth, finishes with the head downwards, and the head, with the six front legs, are thrown off from the chrysalis, and may be found dried up, but quite distinguishable, at the bottom of the web. The butterfly comes out at the top. Is this fact generally known? — *T. C. Turvey, July* 25. 1831.

Caterpillars found in a Book (p. 109.). — These grubs appear to be of a worm-like structure, and are probably those of a small species of solitary wasp (Odynèrus); at least, the following passage in Curtis's *British Entomology*, p. 137., seems to record a perfectly similar fact: — "Mr. Charles Fox detected, upon the top of a book across which another was laid, some cells of a somewhat triangular form, covered externally with mud, and formed of a silky substance within. He very obligingly transmitted the book to me last winter; and in the spring, nearly twenty specimens of the insect figured (Odynèrus parietìnus) made their appearance; they were all females, and did not vary in the least." Is H sure that one cell contained two grubs, as in fig. 41. *a*? and will he communicate any fresh facts respecting them? — *J. O. Westwood. Jan.* 28. 1832.

Notes on Intestinal Worms, in reply to Agronome's Queries. — Sir, Agronome (Vol. IV. p. 476.) appears particularly anxious to have some of his queries answered. I do not consider myself wholly competent to fully elucidate such obscure productions of nature, but I think there are some points which Agronome must consider. The hairworm, found in the body of the common black beetle as well as in other insects (Vol. II. p. 211.), I think is not the Górdius aquáticus, but a species of the genus Filària; which are generally found in the interior of animals, in the cellular substance, in the muscles, and in the parenchyma of the viscera. The most celebrated species is the Filària medinénsis of *Gmelin*, very common in warm countries; which insinuates itself under the human skin, principally of the legs, and often occasions serious injury. It is sometimes found 10 ft. in length. It is extracted by slow degrees, for fear of breaking in the wound, and the negroes are very dexterous in thus withdrawing it. The distinctive character is, to have the ends of the tail pointed or bent. (See Stark's *Elements of Natural History*, vol. ii. p. 408.) I cannot think that the Górdius aquáticus, an inhabitant of water, could live in the interior of any animal either warm or cold blooded; an element so different from their natural habitat. As W. W. asserts the distress it was in even when carefully placed in the palm of his hand, and its speedy death (Vol. II. p. 103.), may not they have attached themselves to the legs of birds who have been in pools of water, and thus found a ready conveyance to W. W.'s garden. The sexual organs appear to be separate in each individual of this tribe. — Agronome also asks, what is the origin of the tapeworm and other worms, in man or beast, or what is their ultimate or last stage of perfection? Their first origin, as well as many other wonders of the creation, will ever remain hid in the deep recesses of dame Nature. They, as worms, have obtained their last and perfect stage, undergoing no further change. How does the tapeworm propagate its species? With sexual organs, or at least distinct ovaries. It was the opinion of the ancients that each joint, if broken off, became a complete worm; but it is now acertained, that, when this is the case, the portion is expelled: but, if a living head be attached to one or more segments, the animal grows to its usual length by the addition of new joints. Domestic animals are equally subject to the attacks of the different species of *Tæ'nia.*

I do not wonder at the supposition of some of the ancient naturalists, that the intestinal worms and hydatids were engendered spontaneously; so difficult does it appear to account satisfactorily for their reproduction. It is, however, now ascertained not only that the greater part produce ova or living young; but that many have separate sexes, and couple as ordinary animals. The hydatids sometimes are found alone in cysts, and sometimes in society, and many groups in various parts of the body, as the liver, the brain, the eyes, and even penetrating the heart. [See p. 99.] How minute must be their ova, to pass through the small tubes of the various structures of living bodies, and lodge in the small ramifications of the liver, brain, &c.! Worms and hydatids, it appears certain, have their sexual organs either united in each individual, or separate sexes; however, they produce ova, which ova are circulated with the blood, and communicated to the child in utero by the mother as well as the eggs during their progress of formation, and develope themselves in various parts of the body. How long they are before they develope themselves I cannot say, nor the duration of the existence either of worms or hydatids: as they have been found both in old and young animals, their developement I think depends upon some favourable state of the constitution, from disease or derangement of some of its organs.



A, The lower part of the trachea of a pheasant cut open.

a and *b*, Branches to the right and left lungs.

c, Worms of a blood-red colour attached to the inner surface of the trachea, by two heads or suckers, varying in length from one fourth of an inch to an inch.

d, Cone-shaped tubercles, in which the heads of some of the worms are inserted.

B, A worm of the natural size.

C, The same magnified when in water.

e, Variously marked. The lower part similar to the convolutions of the bowels, of a light yellow colour, with streaks of blood-red.

f, The head or sucker, surrounded on the edge with a transparent horn-like substance.

g, In the middle is a dark-brown, somewhat transparent, line, with convolutions different from *e*.

h, The head. Its sucker is smaller than *f*.

Birds are also liable to the depredation of worms and hydatids. A short time since, a farmer, who is in the habit of breeding many domestic fowls, had several died in a singular manner. They appeared affected with giddiness, and turned round involuntarily as though running after their tails, until they died with exhaustion. I was not informed of this circumstance until some time after it had occurred, therefore had not an opportunity of an examination; but have no doubt it was an affection of the brain, similar to that to which sheep are subject, that is, hydatids (Cœnùrus cerebràlis *Lat.*, *Tæ*'nia cerebràlis *Gmel.*) in the substance of the brain. Among the game in the preserves around us, the mortality occasioned by these has been very great, attacking the pheasants in particular, both wild and those kept in confinement; the young appear more liable to them than the old ones. Whole broods, after appearing perfectly healthy, and growing to the size of a pigeon, die of a disease called here the gapes, from the manner of its affecting them. They are constantly gaping; and, being gradually exhausted, die.

A gentleman, after great trouble and expense, had hatched eighty rare pheasants; and after anxiously watching them until grown to the size of a pigeon, or to the state of moulting the large feathers, had the mortification of seeing them gradually die of the gapes, with but few exceptions. Upon opening the trachea or windpipe, there were found a number of worms attached to the surface throughout the whole length of the tube, but he has not yet found them in any other part of the body. The accompanying sketch (*fig.* 60.) will convey a better idea than any description I can give.

If Mr. Sweet, or any other of your zoological correspondents, will favour me, through the medium of your Magazine, with any mode of treatment for the cure of birds when so affected, or with any preventive, with such remarks as his experience and observation may suggest, he will greatly oblige, Sir, yours, &c. — *D N. Worksop, Sept.* 1831.

Luminous Appearances on Flowers. — Sir, I send you an account of a curious and interesting phenomenon I witnessed, in May last, on the corolla of a plant of the *P*apàver orientàle, thinking it may be of some interest to your readers, and that, in the approaching spring, they may narrowly watch the above-named plant, and endeavour to discover the cause of such wonderful effects. I was assisting a gentleman in adorning his garden, when he happened to walk near a flower-bed, in the centre of which the poppy alluded to was in full bloom, and overtopped the other flowers. At the moment he was passing, he saw, or fancied he saw, a beautiful luminosity over the corolla of the plant; and called me to see it, for the purpose of convincing him whether it was the fact or not. Afterwards, several other friends were called, and we all saw it, at intervals of about ten minutes, sometimes like a large butterfly encircling the whole of the corolla, sometimes at points on the petals. We went to several other plants in the garden, but could not observe any thing of the kind on any of them. We saw it in this manner for three successive evenings. It was about eight o'clock in the evening, and the atmosphere appeared to be in a very humid and electrical state; drops of water were deposited, and the pollen very much scattered within the corolla. Has not this an electric origin? and does not the edge of the petals act in the same manner as points, and conduct the electric fluid from the earth to the atmosphere, and vice versâ? A practical horticulturist (author of *The Domestic Gardener's Manual*) says, vegetables are the most important instruments of conduction, and that they are constantly employed in regulating the atmospheric electricity. It is recorded that Linnæus's daughter observed a phenomenon similar to the above on the nasturtium (Tropæ'olum màjus); and a similar appearance has been lately witnessed on the tuberose (Poliánthes tuberòsa). I am, Sir, yours, &c. — *J. Green. Great Marlow, Sept.*, 1831.

APPENDIX.

(Printed at the expense of the respective Writers.)

Controversy between W. Swainson, Esq. F.R.S. L.S. &c., and N. A. Vigors, Esq. A.M. F.R.S. &c.

My dear Sir,

I HASTEN to redeem my pledge of replying to Mr. Swainson's letter of the 1st of October. My observations on that letter will necessarily be lengthy, and from the nature of the subject they cannot but be tedious. I offer no apology, however, on this head. The arrangement I have made with you, by which any controversial writings of mine, even although I am forced into the contest, become a gratuitous addition to your Magazine, insures the good effect of their not debarring your readers from more scientific matter, and equally that of not imposing a task upon their purses. The reading of them, it is true, may impose a tax upon their time: but that time is at their own disposal, and if they choose to throw it away on any lucubrations of mine, it is their own fault that they make the sacrifice.

Would that the sacrifice on my part had been equally optional! Would that I could have avoided this war of words, so uncongenial to my feelings so foreign to my habits, — this deplorable waste of time, on a subject as paltry as it is unprofitable! But the duty I owe those valuable friends who have volunteered their kindness on this and many other occasions; the duty I owe to the public, which has confidentially assigned to me places of no slight trust and importance; have imperatively demanded, and still demand, that I should absolve him, whom they have so honoured with their friendship and confidence, from the foul calumny which this writer has dared to propagate.

The mode in which I can bring the attacks of so evasive an adversary as Mr. Swainson before the reader is not easily selected. No comprehensive or systematic view can be taken of the observations of a writer so desultory, so regardless of the point at issue, so inconsistent with himself, and, at times, so contradictory even of his own statements and arguments.

> "Quo teneam vultus mutantem Proteo nodo?"

The only feasible mode, I apprehend, of giving any adequate representation of the contents of this writer's last letter, is that of following his own incoherent order, laying hold of his observations one by one as they occur, and pursuing the rambling series from the outset to the end. A humorous story is related by our friends, Dr. Buckland and Mr. Broderip (*Zool. Jour.*, vol. ii. p. 19.), of a hedgehog despatching a snake by passing its body through its jaws from head to tail, and regularly cranching each of its vertebræ in succession. In imitation of this honest quadruped, who thus methodically puts his slippery antagonist *hors de combat*, I shall separately lay hold of each prominent portion of this wily gentleman's epistle, and extract and expose, for the reader's observation, the true substance of which it is composed.

1. " When a man," says our worthy logician, " for defending his friend, receives abuse, he justifies [whom or what does he justify ?], not to the insulting party, but to the bystanders. I address myself *therefore* to you and your readers."

Most cogent and undeniable is the truism in that former sentence! It wants only relevance to the concluding " therefore," and to the subject at issue, in order to be highly instructive! It is already known to your readers (see my reply, Vol. IV. p. 327.) that the gentleman for whom Mr. Swainson imbibed so sudden, so romantic, so highly wrought a friendship, never was attacked, at least by me, and stood in no need of such a Quixotic champion against an imaginary assailant. The details of the affair between M. Lesson and Dr. Horsfield and myself, will be shortly laid before you in a separate letter, in which it will appear, that if the word " attack " is at all applicable on the occasion, it must be applied to that gentleman, who commenced the warfare, and not to us, who reluctantly replied in our own defence. This has already been fully stated. Mr. Swainson must now be aware of the fact, if, indeed, he ever had a doubt of it; and nothing but the most sullen and dogged obstinacy in adhering to a barefaced assertion, even in the face of conviction, could induce a man to resort to the stale and pitiful trick of reiterating a charge that had again and again been refuted.

" Receives abuse."

Mr. Swainson personally and virulently attacked me in a manner unauthorised by the common forms of society. His accusations were proved by me to be false; his arguments were refuted; their contradictions and absurdities pointed out; and the malign spirit of his attack exposed; and this he calls " abuse ! " I trust that every asperser of his neighbour's fame, that misuses the noble freedom of the press, by making it the organ of his own private piques and paltry jealousies, may meet with similar " abuse" and similar discomfiture!

2. " Violent and reiterated attacks have been made on M. Lesson, and other French naturalists. These attacks have been vindicated by one party, and deprecated by me. The name of Mr. Vigors, either as author, abetter, or editor, is attached to all."

Another stale reiteration of assertions long since proved to be false! I referred in your Magazine (Vol. IV. p. 327.) to the only *two* instances in which I myself came into collision with Continental naturalists. These were defences, not attacks. I equally showed that every other controversial paper with which I had any connection, as editor of the journal in which they were printed, was purely defensive; and I advocated the principle, that it was not only justifiable, but necessary and praiseworthy, to defend opinions which had unjustly been assailed. Mr. Swainson totally evades this train of reasoning; by not replying to it, he tacitly admits its force. He even blindly acknowledges the principle which I advocated, by applying it in justification of himself (see p. 197.); and now, with equal blindness, he fancies he can obtain credence to his ten times refuted assertions, merely by reiterating them! The sturdy convict that asserts his innocence in the teeth of a condemning verdict is not more infatuated than he.

3. " Of the last and worst, 'published under the superintendence of the Secretary, and with the sanction of the Council,' Mr. Bennett steps forward as the avowed author. This may be true."

May be true! The assertion of an honourable gentleman may be true! Such is the courteous and condescending admission of this sojourner in " courts and camps!" From his high and dictatorial station he stoops to admit that an author may have composed his own book. " Garth *may* have written his own Dispensary." Verily, our science is placed in an awkward position, when a man cannot assume the credit of a work which he composes, and publishes openly with his name, until Mr. Swainson deigns to acknowledge him as the author!

But mark the mode in which the words avowedly quoted from the work in question are garbled; "published under the superintendence of the Secretary, and with the sanction of the Council." The most important part of the sentence professedly quoted, the words "*and of the Vice-Secretary*," are entirely omitted. It served, it appears, Mr. Swainson's purpose to keep from observation Mr. Bennett's participation in the management of this work, the particular share which he held in which was fully promulgated on a succeeding leaf; and for this purpose he omits the foregoing most important words; thus attempting to deceive the reader into the belief that the titlepage assigned the whole and exclusive responsibility to me. I shall have occasion, before I conclude this letter, to point out many similar instances of false quotation, which will fully illustrate the nature and depth of Mr. Swainson's argumentative powers. These paltry tricks in argument are by persons of a certain calibre of mind deemed to indicate ingenuity and cleverness. But the moralist, the philosophic reasoner, the searcher after truth, detects them at once, as betraying hollowness of cause and dishonesty of purpose.

> 4. "But I have yet to learn," continues Mr. Swainson, "the difference between the man who originates, and the man who knowingly propagates a calumny; who 'superintends' its concoction; gives it the public support of his name; and implicates a set of gentlemen as sanctioners of the libel who never saw it."

Perfectly just. These are sentiments from which, in the abstract, no man will dissent. But how, in the name of all that is logical, can we deduce any conclusion from them applicable to the present case? Where is the libel, and where the calumny? Mr. Bennett advanced some observations, against which Mr. Swainson directed, as he thought, a very formidable battery. Mr. Bennett repelled the attack, convicted him of gross misrepresentation, and triumphantly maintained his position. Mr. Swainson has indeed much to learn; he has yet to understand that truth is no libel, and justice no calumny. That there have been libel and calumny in the present disgraceful controversy, I must with sorrow admit. But the calumny has been concocted in Mr. Swainson's brain, and the libel has proceeded — impotent, it is true, in its attempts, and abortive in its effects, — from Mr. Swainson's tongue.

But it is worth while to mark the last part of this sentence: —

> "Implicates a set of gentlemen as sanctioners of the libel who never saw it."

If this means any thing, it aims an innuendo at me, that I have implicated the Council of the Zoological Society in giving their sanction to the publisher of the work in question, to describe the animals in their gardens and menagerie. But in what possible manner can I be considered responsible for such an open and official act on their part? A publisher asks the Council to sanction a purposed undertaking: he obtains his request; and he gives publicity in his titlepage to the permission thus granted. The whole is a matter of record, entered in the Council Minutes; and I am no further associated with the transaction than as being one of the Members that granted the applied for sanction, and the Secretary who caused it officially to be recorded. The Council, in point of fact, went no farther than giving their sanction to the undertaking; they are implicated in no respect in the success or failure of the work; and, even if they were, none but a caviller of the most confused or perverted imagination could insinuate that I was the person who so implicated them.

Our profound legislator next proceeds to lay down the law respecting the duties of an editor: and then most logically, as will be seen, proves my total dereliction of these duties: —

> 5. "An editor, in my estimation, is bound to strike out all passages of personal abuse; all charges of base motives; all violent and unwarrantable expressions. Since his name is unavoid-

ably coupled with controversy, he will be doubly cautious in becoming himself an antagonist. Mr. Vigors has neither evinced this discretion, nor manifested this spirit. Had he loved peace, he would not have printed (at whose expense?) the well-known letter on the dichotomous system, *after* it had been published, in a softened tone, *elsewhere*."

[Note.] "It is somewhat singular that the library of the Linnean Society should have been fixed on as the deposit of this *private reprint*, whence the copies were disseminated."

Now, Sir, I mean not to quarrel with Mr. Swainson's editorial pandects. The logical accuracy with which he brings them to bear upon me is all that I wish to arraign. Would not any reader naturally conclude that the instance which he exemplifies as a proof of my deviating from the duties of an editor, was the publication of a controversial paper in a work which I edited? And yet nothing is farther from the truth! Mr. MacLeay's letter on the Dichotomous System was printed in the *Philosophical Magazine*, of which my very valued friend Mr. Taylor is the editor; and with which I am not in the slightest degree connected. My only ostensible connection with the letter, as far at least as Mr. Swainson or any other man has a right to impute such to me, consists in its being addressed to me by Mr. MacLeay. Again, Sir, would not any reader conclude, from the above-quoted passages, that there were *two* publications of the letter? That there was a *reprint*, in short, of it *after* it had been published *elsewhere*? And yet here again is a false assertion. Strange it is to say, that not even in the most trivial particular can the honesty of this writer be relied upon. The letter was set up in type, *once only*, for Mr. Taylor's Magazine. Copies of it were struck off, according to Mr. MacLeay's instructions, to be distributed among his friends. These copies form what Mr. Swainson calls a *reprint*, and they were distributed *before* the letter appeared in the Magazine, some months indeed before some portion of it appeared, but all being from the same type. Mr. Taylor certainly omitted some passages in the concluding portions of this letter, for reasons into which I have never enquired. But the alterations took place *after*, not *before*, as Mr. Swainson with so much effrontery asserts, the distribution of the private copies.

"He would not have printed (*at whose expense?*)" —

In the midst of the melancholy exposure which Mr. Swainson affords of spleen and rancour, there is something at times so truly ludicrous in his quaint observations, that we feel an occasional relief from the general gloom that pervades the subject he discusses. *At whose expense?* With what simplicity are the propensities of some men betrayed; the yellow clay breaking through the plaster of Paris! Mr. MacLeay cannot publish his views or express his feelings in print, but Mr. Swainson must be informed of the name of the person who bears the expense! These penny-a-line gentry cannot be apprised of a scientific publication, without associating with it the ideas of pounds, shillings, and pence! *At whose expense?* If Mr. Swainson cannot restrain his gossiping inclinations on this subject, let him apply to the parties ostensibly concerned in the publication, who may, perhaps, be civil enough to gratify him with the wished-for and important information.

"It is somewhat singular that the library of the Linnean Society should be fixed upon as the deposit [query, depository?] of this private reprint."

Here, again, are betrayed the propensities *of* the man. Every thing to him is a mystery; every thing from him an abortive innuendo. He cannot speak out. He just "hints a fault, and hesitates dislike." The plain and simple explanation of the fact, on the "singularity" of which this man of mystery suggests his astonishment is this:—Mr. MacLeay gave instructions that copies of his letter should be distributed among his friends and the friends of science. Several copies were accordingly sent for that purpose to the Linnean Society, among other various *deposits;* that society being one to which a great proportion of his friends belonged, as well as other scientific persons who were likely to be interested in the subject.

6. "In all this [i. e. in my violation of the duties of an editor], however, there is nothing dishonourable. What I say is, that it implies a want of judgment, and a love of controversy."

This is meant, I suppose, as explanatory of the allegations he brought against me in his letter, printed in your March Number (Vol. IV. p. 97.); and which, if brought home, would have convicted me of most dishonourable conduct. Forsooth, he meant to allege nothing dishonourable! His charges went no farther than to impeach me of want of judgment and love of controversy. Thus will the writer meanly and pitifully attempt to retreat from a position to which he had the rashness to advance, but which he had not the courage to defend. But we must not allow him thus to escape. His accusations are matter of record; their import cannot be mistaken. Let him prove them; or, by his apology, or equally expressive silence, admit their falseness. Yes, Mr. Swainson, you irretrievably committed yourself by advancing, among other charges of dishonour, those of my having published, in a periodical journal of which I was editor, private letters, not intended by their writers for the public (Vol. IV. p. 97.); of being the detractor of men of merit (p. 104.); of not acting in accordance with my own professions (p. 98.); of making my professions of *truth* (so printed in italics for the greater effect) being my guide utterly worthless, by not putting them in practice (p. 105.), &c. &c. &c. I must nail you to these points. Here there shall be no evasion. These charges are either true or false: and on their truth or falsehood depends the reputation of the accuser or the accused. You have not stood to your charges. By a paltry subterfuge, you have endeavoured to shift your ground; and by your failing to substantiate the accusation of dishonour, you are virtually convicted of the dishonourable conduct which you had the temerity to impute to me.

7. "*You are told*, indeed, that I was the first to begin this system. This the asserter knows to be false."

I would here, Sir, ask you, is it possible that a man can be in his sane mind who ventures on such a hazardous expedient as that of misrepresenting his opponent's observations, when the misrepresentation may be detected by the reader's turning back to a few pages in the same work? Let us turn over these few pages, and we shall find that "you are told" no such thing as Mr. Swainson commits himself by asserting that you are. My object in the passage alluded to (Vol. IV. p. 322.) was to justify myself in introducing papers of an alleged controversial nature into a journal of which I was editor, by showing that these papers were defences of the previous opinion of their authors, not attacks upon others; and, consequently, that the publication of them was both just and necessary. I went still farther: I observed, that, even were I culpable in publishing such defences, Mr. Swainson himself shared the culpability, for he was the first that tempted me to the deed. My words — and I was cautious in using them, being aware of the disingenuous character of my opponent — were expressly as follows: — "Your readers will be startled at finding that the very first paper, of a controversial nature, *which I had any share in having inserted into that journal*, was written by Mr. Swainson himself!" Now this is the assertion on my part, which Mr. Swainson, in the language of "courts and camps," says "I knew to be false." And how does he prove this? Because "the very first article of this description in *my* journal is an attack upon him." That previous attack *, however, to which his paper was an answer, was introduced into the journal months previously to my having any connection with it. I knew not of its insertion until I read the published article, like any other purchaser of the work. Even the share I had in inserting Mr. Swainson's paper into the journal was that of using my personal influence with the then conductors to employ Mr. Swainson as a contributor to their work; and several months, as I have already said, elapsed before the journal could be called *mine*, even if my connection with it as editor could entitle me so to consider it.

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* The reader will also perceive, on turning to the passage in question, that I actually absolved Mr. Swainson from any blame, by referring to this

My assertion, therefore, that the first paper of a controversial nature that I had any share in introducing into that journal " was written by Mr. Swainson himself," is perfectly borne out by the fact; and, contrary to the assertions clothed in Mr. Swainson's " courteous and camp-like " phraseology, *the asserter knows it to be true*.

8. " My answer was the first and the last [i. e. controversial paper], until now, that I ever penned: it occupies four pages. The controversial papers of Mr. Vigors, avowedly by himself, fill exactly forty. (*Zool. Journ.*, vol. iii. p. 92—123., vol. v. p. 134—141.) "

It would appear, by Mr. Swainson's reasoning, that controversial papers, like the Sibyl's books, increase in value by decreasing in extent. I never wish to interfere with the opinions of any man on such speculative points; but Mr. Swainson will allow me, I hope, and other readers, to form our own judgment on these points, and square our practice by this judgment. He ought, however, to have given an honest statement of the particular case which he has just adduced; and have added, that of one of the above papers, the first and longest, amounting to thirty-three pages, not one sixth is controversial. He should also have assisted the reader's judgment in reference to that paper, by adding to his account of its length some opinion as to its merits. His own words, taken from a letter now before me, publicly addressed to the referees to whom I wished to leave the arbitration of this unprecedented controversy into which he has forced me, supply the deficiency. At a period subsequent to the publication of his first letter, he thus expresses himself: — " Mr. Swainson has distinctly stated his impressions upon this paper. It is remarkably well written; and, as he has said before, he considers the views and sentiments generally to be ' just.' " How he comes to quarrel with the length of a paper, the views and sentiments of which he pronounces to be " generally just," remains to be accounted for.

Mr. Swainson now proceeds to explain his connection with the Zoological Society: but in a statement which leaves entirely untouched the main points at issue. It will be in the recollection of your readers, that he accused the society of illiberality, *because* he, " not being a member, was prohibited from making any effectual use of the Society's Museum," and was *therefore* forced to go to Paris for study. It was proved against him, first, that he *had been a member*; and would have continued to enjoy all the privileges of a Fellow, if he had adhered to those engagements which every man of honour holds sacred, and not the less sacred because they are but honorary, and may not be enforced by the common process of law. It was proved that, even in spite of this defalcation on his part, — a defalcation which would for ever have slept in oblivion, if he himself had not raked up his own dishonour, — every facility was liberally granted to him of making " an effective use " of the Museum. It was, in the last place, proved, that he, not content with this unhandsome conduct towards a public body, carries his unaccountable hostility against it so far as to accuse it of that very illiberality of which he himself was convicted.

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previous attack upon him. This, in fact, was my strong point; and Mr. Swainson, according to his usual want of tact, plays into my hand, by using my own argument to exculpate himself.

Against all these proofs he opposes the following random and irrelevant statement, which leaves their whole strength unimpaired.

9. "Mr. Vigors, by personal importunity, got permission to write my name on the paper sent round for its establishment. Sir Stamford Raffles was then alive; and Dr. Horsfield, I was told, was to be secretary. Upon these names I relied for a liberal set of measures. I soon, however, quitted London, and never heard more of the Society, until I received the subjoined letter, &c. &c. Sir Stamford in the interim had died; Dr. Horsfield had retired; and the whole concern had assumed the characteristics of any thing but of a liberal scientific institution. I consequently would not confirm my first intention, and declined joining a Society where science was not wanted."

It happens, fortunately, that, in the present controversy with Mr. Swainson, I am saved much trouble in replying to his statements, by using his own words and arguments to convict himself. My reply to the foregoing paragraph will be an extract from the same letter which I have already quoted, in which he gives a different, and, I must add, a truer version of this matter. Before I extract it, however, let us examine the statement itself. He joins our Society in consequence, as he alleges, of the personal importunities of its Secretary — that very illiberal Secretary, with whose sentiments, conduct, and scientific attainments he had so much cause to be dissatisfied. I should, perhaps, point out the incongruity of this cause with this effect, did I not recollect a precedent in point where a similar reason had led to a similar result: the well known case, Sir, of the lady who married a worthless suitor, in order to get rid of his importunities! Dr. Horsfield, he was told, was to be Secretary. The importunate Secretary, who inveigled him into the act of signing his name in the list of members, if he had been asked at the time of such temptation, would have told him who had been the holder of the office from the first institution of the Society, and would have added, that he was ably assisted by Dr. Horsfield, in the no less efficient office of Vice-Secretary. He retired, Mr. Swainson continues, from London, and never heard more of the Society until he received a circular letter calling upon him to fulfil his engagements, or decline being a member. I only here observe, that individuals, wishing well to science, generally make the enquiry of their own accord as to its progress; or, at least, they open their eyes to the public accounts of such progress stated periodically in scientific publications: while individuals anxious to discharge their pecuniary obligations generally volunteer to ascertain the means of ridding themselves of such obligations. The death of the first President, he continues, and the retirement of Dr. Horsfield, followed. Now, Sir, the former was succeeded in the presidency by the Marquess of Lansdowne, and subsequently by Lord Stanley: Dr. Horsfield was succeeded by Mr. Bennett. Unfortunately, however, such names were no guarantee in the eyes of Mr. Swainson for securing to the *concern* the character of a liberal scientific institution; and, alas! for the interests of the society, Mr. Swainson withdrew from it the magic of his name, as well as the *promise* of his two pounds' yearly subscription. But science has still some hope in reserve; still is there some counterpoise to this apparently irretrievable calamity. He has transferred the halo of his reputation to another "concern," where he finds "science is wanted;" and, according to the announcement now travelling the round of the newspapers, with an interest almost equally absorbing as that which attends the daily bulletin of the advance of the Cholera, or the progress of Reform, he has accepted the dignity of Joint Honorary Zoologist to the Surrey Zoological Gardens!

But to come to his own statement of the case, when less under the influence of the irritating feelings of discomfiture. The following is a reasonable statement of it; and if he had restrained his hostility to the institution on which, as appears by his own showing, his circumstances did not permit him to confer his good will, it would have afforded a satisfactory explanation.

"Mr. Swainson's name was among the first set down: this was done when he had resolved upon living in London. Soon after, however, circumstances induced him once more to return to the country, and fix his residence at St. Albans. An interval of near two years had elapsed; and he had never been able to visit the Society's Gardens or Museum, or had he heard any thing of its present plans or progress. On writing, therefore, for some information, and learning that the Society was not, like others of a scientific nature, interested in receiving papers or publishing transactions, and that the only advantage he would derive would be the permission to see the Museum and Gardens; Mr. Swainson requested to withdraw his name: first, because the advantages held out in return for a heavy payment were of such a nature that he could rarely, if ever, avail himself of them; and, secondly, because his fortune is not sufficiently large to allow of his belonging to any more Societies where honours are to be purchased."

Mr. Swainson goes on to state the particulars of the case on which he grounds his charge of illiberality: —

10. "Subsequently, for the advantage of Dr. Richardson's work, I asked permission to use their Museum: permission was granted, but with this extraordinary condition, that whatever I wished to know was to be learned at the discretion of the Secretary; in other words," —

Mark the accurate logic of this subtle reasoner! —

"*in other words*, I was prohibited the free use of my own eyes and my own judgment; and was to solicit those of another, incompetent to understand, much less to throw light upon, my enquiries. I went, however, to Bruton Street,—and I was pencilling some notes upon a well known bird, when Mr. Bennett, with evident reluctance, interfered. He stated that, as Mr. Vigors was absent, I could not, agreeably to his express orders, proceed with my notes, the species I was examining *not being an arctic bird*."

[Note.] "I accordingly applied a second time for 'unrestrained' permission, and was then officially refused."

It would be a senseless waste of time to throw it away upon a reply to the earlier part of the above paragraph. Is there an institution in the world, of which a stranger can be allowed the privileges without some restraint? The Council would have deserted their duty, they would have nullified the privileges of the supporters of the Institution, had they granted Mr. Swainson's request without this necessary, this usual condition. They did no more than the managers of the Paris establishment in the very instance of liberality afforded to Mr. Swainson himself; where the persons in authority merely exercised the discretionary powers vested in them. Mr. Swainson, had he not sought for a ground of cavil, had he really desired to consult the contents of the Museum, would have found the same extensive compliance with his wishes as he met with in Paris, and which, it is to be hoped, he would have experienced in every quarter of the globe where science is cultivated. Dr. Richardson met with it, when engaged on the same undertaking; and Mr. Swainson, from his constant intercourse at the period with Dr. Richardson, must have equally been aware of the extent to which he could have commanded it.

But it appears that Mr. Bennett interfered with Mr. Swainson's free inspection of some birds in the Museum. Now, Sir, I wish I was as cordially given credit for Mr. Bennett's good qualities as I am for his imputed misdemeanours. But really it is not fair to make me at all times answerable for what Mr. Swainson considers his misdeeds, either in print or in office. On this point, however, Mr. Bennett distinctly states that he has no recollection of any such observations having fallen from him in his interviews with Mr. Swainson, as those imputed to him above. On the contrary, he agrees with me that it is impossible he could have said that, "as Mr. Vigors was absent, Mr. S. could not, *agreeably to his express orders*, proceed with his notes." Our reasons are, in the first place, because the Secretary never *gives orders* to the Vice-Secretary, who, according to the

Bye Laws of the Society, has all the authority of the Secretary during his absence, and is equally uncontrolled in the exercise of his duties; and, secondly, because it was *not possible* that he could have given the express order in the particular case before us, as he could not have anticipated the exact nature of Mr. Swainson's application. I have myself to add a third reason, more powerful than either of the above, for it is a matter of fact, not of presumption: it is, because *I did not give such orders*, and, consequently, that Mr. Bennett never asserted that I did. The real fact is, that Mr. Bennett, finding Mr. Swainson at work on some Sumatran birds (common or uncommon he knew not, for he had not studied the subject at the time), mentioned the fact to Mr. Swainson, that this very Sumatran collection was about to be described by the Secretary, and he suggested whether it might not be more delicate to postpone any inspection of them during his absence.

But the best reply is from the same source as the preceding, — from Mr. Swainson's own words. I proceed to quote them. They are from the same explanatory letter from which I before made extracts.

"Now to the main point. Mr. S. has asserted the refusal he received from the Council was illiberal. He thinks so still. Let us look to the simple facts. Here are two naturalists, Mr. Swainson and Dr. Richardson, engaged upon a national work. To Dr. Richardson every facility is given. But so soon as Mr. Swainson goes to the Society's Museum, on the strength of their *general* promise of assistance, and takes out his book to pencil a few notes upon two or three Indian birds *long ago described*, he is politely told by the Vice-Secretary that such proceedings cannot be allowed without a special order. An official application, therefore, for unrestrained permission was asked. After an interval of nearly a month, a polite refusal was given, with a voluntary offer from the Secretary, stating his wish of giving Mr. S. 'every information' in his power. So far Mr. S. has reason to thank Mr. Vigors personally."

Let your readers, now, Sir, compare these two discordant representations of the same circumstances by the same hand, and at the same time compare both with the third version of the same occurrence, which appeared in the commencement of the attack in No. XVIII. of your Magazine (Vol. IV. p. 97.); and I will ask him, whether a charge ever was brought forward against a public institution more paltry in its nature, more unfounded in fact and unsupported by testimony, or one which has more effectually broken down under the unskilful management of him who undertook to handle it?

11. "In this way has been manifested that 'spirit of disinterestedness and liberality,' which, *as Mr Vigors says*, 'renders him a marked man.'"

I quote the above passage merely to point out an instance of Mr. Swainson's dishonesty in quotation. Any reader would suppose that I had made use of the words quoted above, and in the sense which the juxtaposition of the two clauses of the sentence would infer. And yet, Sir, such is not the fact. I simply stated (Vol. IV. p. 335.) that "*the attempt to introduce into science* a spirit of disinterestedness and liberality could not fail to excite a hostile feeling on the part of those whose connection with science was based on selfish and sordid considerations;" and after the interval of a page, having declared that "the attempt to impart a higher tone, and a purer spirit, into natural science, is a crime not to be pardoned," I added, "*the reformer* becomes a marked man." Can any subterfuge be more despicable than that of thus distorting one's words and meaning; or any cause more debased than one which has recourse to such flagrant dishonesty?

But Mr. Swainson is as great an adept in shifting his own grounds as in misrepresenting his adversary's words. I met his charge against myself, of illiberality in debarring men of science from the use of the Zoological Society's Museum, by mentioning that the greater part of that Museum had been my private property, and that, if I had been tenacious in securing its advantages to myself, I had the full power of so doing. He does not deny this: but he rejoins, that the collection is not worth being consulted.

12. [Note.] "This collection, so much vaunted,"

Where has it been vaunted?

"I have often seen. I may safely say it is decidedly inferior to the *duplicate* series of birds, insects, and shells in my own collection."

And yet this is the very collection which he solicited permission to consult; by which, even under the peculiar circumstances of his defalcation to the Society, he had the indelicacy to endeavour to profit; and for their alleged refusal to open which to his unrestrained investigation, he had the temerity to accuse the Society of illiberality! By such strange lapses of memory, by such palpable and unaccountable contradictions, does this writer refute his own assertions. His own breath is sufficient to level the frail erections of his malice.

But he has another subterfuge in reserve. The Secretary, he fears, may perhaps be thought to have shown some liberality in transferring his collections to the Institution to which he was attached; but then he has bartered that gift for the patronage which his office confers upon him.

13. [Note.] "There is a vast deal of patronage, *I hear*, in a small way, in the gift of the Secretary."

A man of honourable feeling, *if he had heard* such reports, would have hesitated, following the dictates of his own bosom, to have given credit to them: but, before he had ventured to whisper them to the world, he would have enquired from authentic sources into their truth. Had Mr. Swainson acted this honourable part, he would *have heard*, that in the course of the six years during which I have held the confidential office of Secretary, I have made *one* appointment, — an appointment, made at the very outset of the Institution, at the express request of Sir H. Davy and Sir S. Raffles,— the letter of the former to the latter on the subject is now lying before me, — and one which naturally fell to my nomination, that of assistant to myself as Secretary. He would, moreover, *have heard*, that, from that hour to the present, although hundreds of persons have been employed in our establishment, and tens of thousands of pounds have been expended in the advancement of its objects, I have not used the influence which my office may be supposed to have conferred upon me, in recommending a single individual to any place of trust or emolument, to whom I can in anywise directly or indirectly be supposed to be the patron. I boast not of this fact; nor am I singular in being swayed by this principle. Mr. Swainson may learn, if he enquires, that there have been other members of our Council, of greater authority and still higher pretension to influence than I could ever advance, who have laid down to themselves on entering office the same disinterested principle, and have uniformly acted according to its dictates. Let Mr. Swainson make these enquiries, and he will probably have a higher opinion of human nature than he seems at present disposed to form of it.

I pass over the next paragraph, merely because I really cannot comprehend the writer's drift. He tells us that he has "divested this subject of all personal considerations," and yet he enters at the very next page upon "personal reflections!" He tells us again "he will return to it (this subject) ere long;" and yet a short time afterwards he informs us, that "nothing shall now tempt him to another reply!" In speaking of his discarding "all personal considerations," he gives the following motives for so doing:—"*for* a large body of liberal-minded gentlemen shall not be brought into disrepute and contempt by the petty jealousies of a few "monopolisers of petty power." For this curious *non sequitur*, and the other extraordinary contradictions of this curious paragraph, I must really blame your printer's devil, who ought to have assisted in giving intelligible utterance to remarks which Mr. Swainson's angry feelings rendered himself too confused to express with clearness.—Proceed we now to the "personal reflections."

14. "First, then, on my 'grade' and 'profession.' My interrogator was, or is, in the army; consequently he knows, or should know, that he of whom he writes is his superior officer, and that, in 'camps and courts,' he must give him place."

The exact degree of precedence that exists between Mr. Swainson and myself in "camps and courts," I must leave to himself to determine. He will find me little solicitous on such points; and not the less so because they refer to matters of facts, not of words. A man's birth, his station in life, the estimation in which he is held by his countrymen, are matters not of opinion or argument, but of record and history. There let them lie. One word only as to Mr. Swainson's military and courtly supremacy. Although some of the happiest associations of my early days are connected with arms, yet the circumstances of having borne the colours of a gallant regiment for the short period of one or two years—a period rendered thus limited by the accidents of war — give me but little pretensions to rank or preeminence, even were I disposed to assert any, or even were such claims allowed to supersede those of birth or hereditary station. Mr. Swainson's pretensions on this score are even, if possible, still less than mine. His connection with the army, as far as I can collect from his own observations, —if I have mistaken him, I am open to correction,—originated in his being in some way employed in the commissariat department.

This is amongst the worst of those ludicrous exposures into which Mr. Swainson has been betrayed in his ill-digested attempt at exalting himself into consequence by the aspersion of one whom he conceives to be a rival. Had he a more just and extensive knowledge of human nature in general, or a less exalted opinion of himself, he would have known that liberality of sentiment and a nice sense of honour are confined to no station in life; and that it is only the vain pretensions to superiority, swelling out beyond the narrow limits of a lowly grade, that exposes the pretender to derision. These are truly the "fantastic tricks" which, although they may make "the angels weep," cause no inconsiderable share of merriment among frailer mortals. Sterne's Marquis, when he betook himself to the collection of pounds and pence, deposited his sword among the archives of his ancestors: but Mr. Swainson perseveres in retaining the sword in conjunction with the palette, in a happy union of Cocker and the cockade; with him knight-errantry struts about, and "frets its hour," on the Exchange. Here we have a Bobadil of the quill, a Drawcansir of the scraper, a veritable Copper Captain!

15. "Opprobrious expressions are heaped upon me [where?] for receiving pecuniary recompense for my writings. Here, again, I find myself in a goodly company, headed by Sir Walter Scott. *We* are all, it seems, 'jobbers,' — 'money-changers,'—'dealers in *literary*'"

How comes the epithet introduced on this occasion?

"'or scientific peltry!' With such epithets does this writer insult that mighty and intellectual power of the country, engaged to instruct or delight the world!"

Excellent! another most congruous association! Parnassus in alliance with Grub Street! The modesty of the man, in linking himself with the author of Waverley, is nearly as amusing as the honesty of the quotation by which he slily attempts to effect the union. I have seen it somewhere recorded, that, at the representation of a certain splendid equestrian drama, where the quadruped performers vied with the biped in eliciting the thundering applause of the spectators, an honest saddler in the pit, transported by the enthusiasm of the moment, and anxious to identify himself with the merits of the exhibition, roared out in an ecstasy of delight, "I made the saddles! I made the saddles!" With equal enthusiasm, equal *naïveté*, and nearly equal justice, does Mr. Swainson call out for a participation in the honours due to that mighty and intellectual power, born to instruct and delight this nether world.

But I must, if possible, be serious. I shall not allow for a moment the insinuations of this wily gentleman to convey the impression that I should ever hazard a word of contempt upon those master spirits of the present or any age, who have worked out for themselves an honourable recompense by the labours of the mind. To the principle of achieving independence by such glorious labours I give my most hearty concurrence, not only as consistent with every honourable feeling, but as absolutely necessary in the present state of society to urge men of science to active exertion. *It is the abuse of the principle alone that I reprobate.* I will even go farther. I will maintain that it is not those alone who exchange for their daily support the results of these labours of mind or body which nature has placed at their disposal, that come within the scope of our present observations. The most apparently independent man in the empire, the very landed proprietor who leases out his hereditary domains for a yearly rent, is as subject to the imputation of bartering for money the advantages of his birth, as he that exchanges for a similar recompense the equivalent advantages of nature. But it does not follow, because commerce may exist on a large and liberal scale, because the "merchant princes" of the world, by their zeal, their enterprise, the unbounded magnificence of their labours, may pour down innumerable blessings on their fellow-creatures, in return for the advantages they confer on themselves;—it does not, therefore, follow, I say, that rapacity and extortion, and sordid feelings and mercenary motives, do not prevail in the inferior grades of commerce. Nay, have not the most atrocious crimes been perpetrated from appetite of gain — from the days of him — the first arch-betrayer — him of the thirty pieces of silver — down to those of the wretched miscreant who has lately expiated upon the scaffold the crime of extinguishing that life which he could not confer, for an equally despicable recompense? And shall we not conclude, by a similar train of inference, that although, in the higher grades of intellectual commerce, the princely merchants, if I may so call them, of the mind may continue to instruct and delight mankind without a blot on their fair fame, still the meaner passions of avarice and sordid jealousy may tempt the inferior plier of the trade to base and disgraceful subterfuges; nay, to the breach of all social obligations; to the betrayal of the cause which he professedly espouses; to the defamation of his fellow-labourer's name; to the murder of his reputation; in the paltry hope of monopolising to himself all the pecuniary advantages that may be supposed to accrue from the extinction of a rival? Again, Sir, I repeat, that it is the abuse of the principle that excites my indignation. Let Mr. Swainson steer clear of this abuse, and his labours will have my warm and unqualified commendation.

But Mr. Swainson disclaims all such motives, and appears indignant at my pronouncing him to have been "employed" by Dr. Richardson, and to have received pecuniary recompense for such employment. Your readers, Sir, on turning to my observations on this subject (Vol. IV. p. 333.) will perceive that their drift was to the following effect: — Mr. Swainson accused the Council of the Zoological Society of illiberality, inasmuch as they did not permit him, as he alleges, to consult the contents of their Museum towards the completion of a "national work." I disproved his charges, by showing that he had every facility of consulting the collection, if his own temper had permitted him to profit by the Council's truly liberal compliance with his wishes. I, moreover, carried the war into the enemy's quarters, retorting upon him most justly the charge of illiberality, in endeavouring to appropriate to himself the advantages of a Society, which he had not sufficient generosity to support; and more particularly when he sought these advantages for the purpose of benefiting a work on which he was employed, according to common rumour, with liberal pay. His endeavour, in his present reply, is to persuade the reader that he received no pay for this work; nay, that he prosecuted it at a considerable sacrifice of expense and labour. His defence is well got up — indeed, it is the only instance of his attempting to advance any proof, or adduce any witness to support his assertions; well got up, I mean, in reference to the ingenuity, not to the honesty, of the attempt; it is worth transcribing: —

> 15. "I am moreover employed by Dr. Richardson. The nature of this employment will be best understood by the following extract of his letter: —
>
> "'Dear Sir, I have had the honour of your acquaintance now for upwards of three years, during which we have been mutually engaged on the ornithological part of the '*Fauna Boreali-Americana*; and, so far from your being guided solely by mercenary motives, you have voluntarily, and at a great personal sacrifice of time, and a considerable one of expense, contributed a large and most material part of the letterpress to that work; although you have not received any pecuniary reward for these exertions, and were perfectly aware, from the first, that you never could derive any. Your conduct to me has been gentlemanly, and strictly honourable throughout, and I have derived both pleasure and profit from your society.
>
> 'I remain, ever your sincere friend,
>
> 'JOHN RICHARDSON.'"

There is but one fault in the getting up of the above defence, or rather, I should say, in the testimony that is adduced to support it — it is overdone. The doctor's extreme anxiety to absolve Mr. Swainson from the imputation of receiving emolument from the *letterpress* of the work; his over-solicitude to express the honour, the pleasure, the profit he derived from his acquaintance for upwards of three years; the extraordinary sincerity of his friendship towards Mr. Swainson; all this exuberance of good-will is so utterly out of place on the present occasion, where the simple question of *pay*, or *no pay*, for a particular work is to be decided, that a reader is tempted to imagine something is intended to be glossed over. Who has not seen a lapwing fluttering round the dog that hunts after her nest, and betraying by her overstrained solicitude that there is an object, not far distant, from which she would lead him astray? The pursuer may be deceived; but the cautious by-stander immediately detects the artifice. The point at which we wish to arrive in the present investigation is not, as Dr. Richardson has been led to imagine, — for I entirely acquit him of all share in the attempt at deception, — is not the liberality of Mr. Swainson in providing a particular portion, namely, the letterpress, of the work; every person knows that this portion of such undertakings is ever supplied gratuitously; nor is it Dr. Richardson's highly wrought feelings on the subject; but, whether Mr. Swainson was, or was not, employed by him, Dr. Richardson, for recompense, on the work in question. This, Sir, is the fact, — the fact, in despite of all Mr. Swainson's ingenuity to conceal it, — the fact, in despite of all the doctor's flutter and solicitude to gloss it over; it is the fact, that Mr. Swainson was employed by Dr. Richardson, on the part of government, in engraving the plates of the work, the only portion of such works on which there is ever a question regarding recompense. It is equally the fact that he was amply paid for the employment.

But it would appear that Mr. Swainson feels sore at the imputation of being "employed" by any man. Even here was I cautious: aware of the sensitiveness of these gentlemen of the quill, who strut occasionally in military masquerade, and talk largely of precedence in "courts and camps," I was select in my phraseology; I was guarded in confining myself to the use of words applied to our military acquaintance by his sincere friend and honoured coadjutor. I transcribe the following note, as well to demonstrate that I had a precedent for the use of the term

" employed," as to justify myself in alluding to Mr. Swainson's " professional pursuits," by evincing that his own immediate friends make no scruple in treating him as an artist by professiōn, and that by his own desire.

> " Dear Sir, London, Dec. 29. 1830.
>
> " Mr. Swainson, supposing that Captain King may be assisted by government in publishing his Ornithological Discoveries, *is desirous of being employed* to make the drawings, without reference to the text. If you can assist him in this matter I shall feel obliged, and I am certain that no English artist can do them greater justice. Yours truly,
>
> " JOHN RICHARDSON."

What! you will here, Sir, probably exclaim, of what importance is all this parade of Mr. Swainson's pretensions, or his professional labours, in the eyes of the public? Certainly, Sir, I will answer, not of the slightest. But Mr. Swainson is accountable for the introduction of the frivolous discussion. He volunteered to charge a distinguished public body with illiberality; and it is of importance that the true nature of such an imputation should be sifted out, and the true character of the impugner exposed, even at the expense of much paltry detail. The very date of the above letters is of consequence. It shows the disposition and character of the man, who, on the 27th of December could authorise an application for employment to individuals connected with a Society which, at the very moment of his application (for this letter of the 10th of the same month must then have been passing through the press), he was in the very act of daring to traduce. Had not Mr. Swainson voluntarily outraged the common courtesies of life, by this wanton attack upon a Society which the general *esprit de corps* of scientific men would have taught him to respect, no such exposure would have come to light. His professional exertions would have been cheered, encouraged, and with justice commended, by every man connected with his science.

Ohe! jam satis! — Weary am I, and weary must you, Sir, be, if you have travelled so far in my company, over this dull and dreary road; and yet there is still more toil before us. A word as to my profound ignorance of my own principles of science.

16. " Here we have one party meanly betraying, or ignorantly misrepresenting, his master: — .... He ' who adopts theories he does not understand ' is Mr. Vigors. He has proved this, in his own words, in his published writings. I have convicted this person, moreover, of being profoundly ignorant of the very essence of that quinary and circular system upon which he publicly lectures."

Here, Sir, at last is a question of some real importance; the only point, certainly, in the curious farrago of logic and science before us, that deserves the attention of the naturalist: of course, I cannot enter upon it in this place; assertion is all that we have before us; and I do not mean to contend with a shadow. Mr. Swainson's views in science are published elsewhere. As yet I have refrained from consulting them, being desirous of keeping all scientific matters apart from this frivolous discussion; but I hope shortly to have leisure to give his work that dispassionate attention which will enable me to ascertain, and fairly review, its pretensions. At present I claim a few words as to my imputed ignorance of Mr. MacLeay's principles.

Nothing, Sir, is more easy than for a writer to hazard an assertion, the truth of which apparently can be ascertained only by an appeal to a distant witness. It requires time to collect such testimony; and the assertion, in the interim, may obtain some credence, from the want of contradiction. But it fortunately happens, in the present case, that there is no want of evidence to disprove Mr. Swainson's assertion.

The question before us, let it be remembered, is not, whether my views of nature are right or wrong, but whether they do or do not accord with Mr. MacLeay's principles.

Now, Sir, I have ever avowed that my first connection with zoology, at least as a practical student, took its rise from the perusal of Mr. MacLeay's first work, the *Horæ Entomologicæ*. I was attracted by the originality of his principles, by the depth of his philosophy, and by the superior luminousness of the mode in which he elucidated the great truths of nature. I sought, and had the happiness of attaining, Mr. MacLeay's intimate friendship. I continued for some years in daily intercourse with him, consulting him on the very principles now in question, from all which advantages Mr. Swainson knows he was himself precluded: and my arrangement of the groups of Ornithology, as published in the *Linnean Transactions*, and on which any public lectures which I may subsequently have given were founded, was commenced and prosecuted under his auspices. Nay, the very paper itself, which contained that arrangement, went under his immediate revision, sheet by sheet, as it passed through the press; he having undertaken the official duty of superintending it, in the place of his father, who, at the time, was secretary of the Linnean Society. Here is proof — strong presumptive proof, at least, — that the principles which I profess are not at variance with those of my friend.

But we are not limited to this presumptive evidence. We have positive proof, the direct testimony of Mr. MacLeay himself, given as if in anticipation of the reference that would be made to his opinion, clearly demonstrating that in one, at least, of the grand principles which it was his object to establish, and that, perhaps, the most important, — the law, I mean, of continuity existing in nature, as it relates to forms of matter, — my researches in Ornithology have been conducted upon the same principles, and my conclusions have been similar to his own. Referring to this continuity, he thus expresses himself: — " I think I have proved this in my Analysis and Synthesis of Petalocerous Coleóptera: you, my dear Vigors, have proved it in Birds." *

I shall not throw away a moment upon the curious correspondence introduced at page 485. Vol. IV. of Mr. Swainson's letter; in which are some passages that serve him as a foundation for his assertion that I have meanly betrayed, or ignorantly misrepresented, Mr. MacLeay. Such a mass of confusion prevails throughout the garbled quotations in that page, that I confess myself at a loss to discover their drift, or their relevance to the subject: but I conjecture that they refer to some observations of mine as to the injudicious use of the terms *natural* and *artificial* systems. I had stated in one of my lectures my wish that naturalists, in the use of these terms, would confine themselves to their strict acceptation; and thus avoid the ambiguity that attends the indiscriminate application of them to the arrangements of Natural History. I suggested, in accordance with Mr. MacLeay (*Zool. Jour.*, vol. iv. p. 404.), that there *is but one natural system*, namely, the original plan of the creation; and that the systematic arrangements of man, however faithfully they may represent *this one natural system*, must themselves be artificial. Mr. Swainson, it appears, thinks differently. He pronounces the system, at least, of one naturalist, — the quinary system, — to be *the natural system*, or rather, as he corrects himself in a note, to be *part of* the natural system. Here we are at issue; probably Mr. Swainson may be right, and I wrong; but let the difference between us be understood. I say that any system proposed by man may well represent the objects of nature, but still will artificially represent them: Mr. Dollond's terrestrial globe, for instance, with all its zones, meridian lines, &c., may be a faithful but still an artificial symbol of the earth. Mr. Swainson, on the other hand, declares that it is "the great globe itself," or perhaps a part of it. Of this, however, more elsewhere.

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* Letter on the Dying Struggle of the Dichotomous System, p. 22.

But my patience, and indeed my time, is exhausted. Many ludicrous points in this entertaining epistle of our military scribe remain yet untouched, and must continue so for the present. One last instance of his syllogistic powers I must, however, adduce. In his first letter, commencing his attack on me, he begins with a lamentation over the fall of science; he consoles himself, however, in his troubles, by being able to trace the causes of this fall. They amount to three: — the denial of great truths; the misunderstanding of great theories; the introduction of great oratory. In my reply to his epistle, I ventured to doubt the fact that science had declined, and I decidedly denied the influence of any such causes as he specifies, even allowing them to have existed, towards the production of any such effect. I suggested, in short, the deficiency of Mr. Swainson's logic. He again returns to the subject; and how does he rebut my observations? — by showing that our science has declined? — by proving that his three-headed cause has been in operation, or could have had any influence over the true interests of science? No, Sir; he simply takes up his parable against me, and says, "I am the man." I, in short, am the delinquent, whose want of understanding the subject of which I treat, has overturned the goodly edifice of science in this country! So, then, I am, it seems, the mighty Atlas that sustains the whole weight of science on his shoulders; and, because I may be a blockhead, Zoology falls to the ground. How blindly does this man exalt the person whom he means to depress! One would imagine that I had laid the snare for him by which he is thus unwarily entrapped. But such is not the case: he has fallen into a pitfall of his own construction. Mr. Swainson, indeed, as I have said elsewhere, has much to learn. Let him emerge awhile into light from his murky seclusion, which serves but to foster the "sweltered venom" of his nature, and look abroad into the world of science, and he will find that at no period has Zoology — from the immense accumulation of facts, as well of ancient as of recent date, from the vast accession to her stores in Physiology and Comparative Anatomy, from the comprehensiveness of the views with which these materials are applied to the purposes of science, and the number and ability of her votaries — attained such an elevation as at the present moment of her alleged decline and ruin. He will find, I repeat, that her cause does not hang in suspense on the prowess of a single arm; but that, even if the humble individual should fail, whom his inconsistent malice has exalted into the "Piercy" of the field, still will she have in reserve, to unfurl her banners and maintain her battle,

"Five hundred good as he."

I would fain add a few more last words: but time is pressing, and the little leisure I can at present snatch from more serious pursuits, to throw away upon this worthless subject, is now exhausted. Much Nemains yet to be noticed in Mr. Swainson's letter. I shall probably return to it before long.

I have also to apologise for not sending you the reply which I had promised to M. Lesson's letter. In your next Number I hope to be more punctual. I am, dear Sir, truly yours,

N. A. Vigors.

Regent's Park, Feb. 1832.

Reply to Mr. Rennie's Remarks on the Swainsonian Controversy (Appendix, p. [110.]). By W. Swainson, Esq. F.R.S. L.S. &c.

Dear Sir,

I have to say,— 1st, that Mr. Rennie forgets. *I have not* published any part of *the* letter containing the *secret* opinions of Mr. —— on the quinary system. This *third* letter is *the* letter prohibited. I quote only *two*. Secret opinions, *in matters of pure science*, are eminently ridiculous. 2dly, Neither MM. Desmarest, Lesson, nor myself will read, much less reply to, any thing from Mr. Vigors; and, to insure this, 3dly, my bookseller in future will tear out the Appendix.

Yours, &c.

Feb. 17. 1832. W. Swainson.

Controversy regarding Swainson's "Zoological Illustrations," between A. R. Y. and Mr. Swainson.

Sir,

The packet which I received from you on the 22d of February conveyed to me the following very handsome and gentlemanlike letter, from Mr. Swainson, on the subject of the little controversy which has lately taken place between us. As the letter in question at once does both credit to Mr. Swainson, and (I think) justice to myself, and as I have his full permission to publish the same, I cannot resist the inclination I feel to request you to insert a copy of it as an appendix to an early Number of your Magazine, and, according to your justly established rule, to charge the expense of printing it to my account.

I have only one further observation to offer. Mr. Swainson states, that from the half-crown numbers, of which I ventured to complain, less profit results than from any of the others, and that the price is not a remunerating, but a losing one. This statement does certainly surprise me. But although I am not sufficiently skilled in "the tricks of printing" to be able to account for what appears to me so extraordinary a fact, I must declare that I am the last person to doubt the veracity of a gentleman, and more especially of one who so candidly admits that my reasoning on the subject is not ill founded.* As the objectionable practice with which I found fault is, it seems, productive neither of profit to the author nor satisfaction to the purchaser, I trust it will henceforth be avoided by all who may in future commence a periodical publication.

For Mr. Swainson's kind offer to supply me with the two remaining Numbers of his *Illustrations* I feel truly obliged, but need not trouble him, as, no doubt, I shall be able to procure them, as heretofore, through the bookseller.

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* I wonder whether the author, or editor, or publisher of the *Botanical Register*, or whoever may be the person concerned, is prepared to make a like candid avowal and explanation in *his* case. The practice of charging one shilling for a titlepage and index for this work, and, what is worst of all, impudently styling the same an *Appendix*, has still been persisted in up to the first of the present month. I think Mr. Lindley, whose honourable name occupies so conspicuous a place in this costly titlepage, ought to come forward with an explanation, were it only to exculpate himself (as I have no doubt he could do) from any participation in the blame.

I now take my leave of this controversy, assuring Mr. Swainson, that, forgetting all that has passed, I should feel happy, had I the honour of an introduction, to shake hands with him on the most friendly terms.

I am, Sir, yours, &c.

February 23. 1832. A. R. Y.

To the Editor of the Mag. Nat. Hist.

(Copy of Mr. Swainson's Letter to A. R. Y.)

Tittenhanger Green, St. Albans, January 2. 1832.

Sir,

It is at all times repugnant to my feelings to carry on any discussion which borders upon controversy, with one for whom I entertain either respect or kindly feelings; and your writings (however we differ in opinion) have certainly excited both. I shall not, therefore, pursue the subject farther. It was perhaps ill-judged in adopting the practice you complain of in the first instance, and you reason well upon the subject. It may be obstinacy in me, perhaps, to continue it; but, having fixed upon this mode of publishing my own works, the public must take them for better or for worse. You may, perhaps, think it incredible that less profit results from the half-crown numbers (originating in the *tricks* of printing) than from any of the others; the price, however high, is consequently not a remunerating, but a *losing* one. I had some thoughts, now that my labours for Dr. Richardson have closed, of continuing the *Illustrations* with regularity and spirit; but I cannot bear the public imputation of having acted meanly and sordidly; and I shall therefore close the work with two more numbers. Your own copies shall be sent you, if you wish them, to the care of Mr. Loudon, or to Messrs. Longman and Co. This will insure you a perfect set, without the trouble of giving repeated orders to your bookseller. I might have mentioned this as one of the consequences of "perpetually assisting others," rather than first attending to my own interest, and prosecuting the regular publication of my own works. I should have remembered the fable of our youth, about the Good Man and the Ass.

For the handsome manner in which you have spoken of me individually, accept my best thanks, and allow me to subscribe myself

Your sincere well-wisher,

William Swainson.

P. S. — I believe no notice, such as you allude to, was published in the prospectus of the first series; and if you think this admission *should*, in justice to yourself, be made public, you are at full liberty to send this letter, or any part of it, for Mr. Loudon's next Number.

To A. R. Y., care of Mr. Loudon.

THE MAGAZINE

OF

NATURAL HISTORY.

APRIL, 1832.

ORIGINAL COMMUNICATIONS.

Art. I. *Contribution towards an Account of Omens and Superstitions connected with Natural History.* By J. C. Farmer.

Sir,

In reading that pleasant volume, by the late Sir H. Davy, entitled *Salmonia*, I was so struck with the following remark respecting omens, that I transcribe it, and add to it an account of some which I do not think have yet found their way into print, in the hope that others may do the same, and add such explanations as may suggest themselves to account for such seeming absurdities. " The search after food, as we agreed on a former occasion, is the principal cause why animals change their places. The different tribes of wading birds always migrate when rain is about to take place; and I remember once, in Italy, having been long waiting, in the end of March, for the arrival of the double snipe in the Campagna of Rome; a great flight appeared on the 3d of April, and the day after heavy rain set in, which greatly interfered with my sport. The vulture [see its habits narrated p. 233. of the present Number], upon the same principle, follows armies; and I have no doubt that the augury of the ancients was a good deal founded upon the observation of the instincts of birds. There are many superstitions of the vulgar owing to the same source. For anglers, in spring, it is always unlucky to see single magpies; but two may always be regarded as a favourable omen; and the reason is, that, in cold and stormy weather, one magpie alone leaves the nest in search of food, the other remaining sitting upon the eggs or the young ones; but, when two go out together, it is only when the weather is mild and warm, and favourable for fishing." (p. 156. 1st edit.)

This reasoning will, in general, be found correct, and may be applied to solve many of the superstitions in the country; but the case of the magpie is entitled to a little more consideration. The piannet, as we call her in the north of England, is the most unlucky of all birds to see singly at any time; this, however, does not often happen, except a short time during incubation: they either appear in pairs or in families; but even this last appearance is as alarming to our grandmothers. The following distich shows what each forebodes: — "One sorrow, two mirth, three a wedding, four death." This bird, indeed, appears to have taken the same place with us, as an omen of evil, that the owl had amongst the ancients. [See its ominousness exploded, and its positive benefits to man demonstrated, by Mr. Waterton, p. 9.] The nurse is often heard to declare that she has lost all hopes of her charge when she has observed a piannet on the house-top.*

Another prejudice, indulged in even by our goodwives, is that of destroying the feathers of the pigeon, instead of saving them to stuff beds, &c. They say, that, if they were to do so, it would only prolong the sufferings of the deathbed; and when these are more than usually severe, it is attributed to this cause: and the reason given, "because the bird has no gall," is to them quite conclusive, but to me perfectly irrelevant and unsatisfactory. A belief amongst boys, that to harm or disturb the nests of the redbreast or swallow is unlucky, appears very general throughout the kingdom; and the keen bird-nester, who prides himself on the quantity of eggs blown and strung bead-fashion, here often gets mortified by finding his trophies destroyed by the housewife, who considers their presence as affecting the safety of her crockery ware. This belief may have been encouraged, if not invented, for a humane purpose; but how are we to account for the efficacy of the Irish stone in curing swellings caused by venomous reptiles, by merely being rubbed upon the part affected? The fullest faith in the practice appears to have prevailed in the country at no distant period, and is yet far from extinct. The swallow and the cuckoo are generally hailed as harbingers of spring and summer; but, perhaps, many of your readers are not aware that it is only lucky to hear the cuckoo, for the first time in the season, upon soft ground (in contradistinction to hard roads), and with money in the pocket, which the youngster is sagely advised to be sure then to turn over.

* A rare sight in England, even in villages. The magpie here avoids man and his houses all it can. Gerarde, in his *Herbal*, incidentally remarks that magpies are "called in some places pie-annes," which helps us to an etymon of the above term piannet.

Perhaps the season of the year may satisfactorily explain all these observances. Several superstitious customs are mentioned in this Magazine * [Vol. I. p. 93. 196. 303., Vol. II. p. 105. 209. 405.] regarding bees, some of which are not practised in the north, yet it is fully believed that the death of the stock of hives too often foretells the "flitting" of the bee-master. Wet cold years, unfavourable to the insects, are also equally so to the farmer upon thin clays, which border the moors, where bees are mostly kept. Has the use of the mountain ash, "rowan tree" [*Pỳrus aucupària Gærtner*], as a charm against witchcraft, ever been accounted for? The belief in its efficacy must be very old, if we are to credit some of Shakspeare's commentators, who give this word as the true reading in Macbeth, instead of "Aroint thee, witch!" †

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* The following additional instance has been lying by us some time, and may be here fitly introduced. — *J. D.*

Superstition respecting Bees. — Sir, The following passage, which I have extracted from a *Tour through Brittany*, published in the Cambrian *Quarterly Magazine*, vol. ii. p. 215., gives us some interesting information of the regard which seems in most countries to be paid to these esteemed little animals: — "If there are bees kept at the house where a marriage feast is celebrated, care is always taken to dress up their hives in red, which is done by placing upon them pieces of scarlet cloth, or one of some such bright colour; the Bretons imagining that the bees would forsake their dwellings if they were not made to participate in the rejoicings of their owners: in like manner they are all put into mourning when a death occurs in the family." There are instances mentioned of their being put into mourning, in your First and Second Volumes; but I do not remember one of their having a share in the marriage rejoicings. Yours, &c. — *D. C. Oxon., April* 4. 1830.

† It is hoped the appended quotation will not be deemed inconsequent here. — *J. D.*

Superstitious Belief in the Power of Trees. — Near Boitpoor, in Upper India, "I passed a fine tree of the mimosa, with leaves, at a little distance, so much resembling those of the mountain ash, that I was for a moment deceived, and asked if it did not bring fruit? They answered no; but that it was a very noble tree, being called 'the imperial tree,' for its excellent properties: that it slept all night, and wakened, and was alive all day, withdrawing its leaves if any one attempted to touch them. Above all, however, it was useful as a preservative against magic; a sprig worn in the turban, or suspended over the bed, was a perfect security against all spells, evil eye, &c., insomuch that the most formidable wizard would not, if he could help it, approach its shade. One, indeed, they said, who was very renowned for his power (like Loorinite in the *Kehama*) of killing plants, and drying up their sap with a look, had come to this very tree, and gazed on it intently: 'but,' said the old man, who told me this, with an air of triumph, 'look as he might, he could do the tree no harm;' a fact of which I make no question. I was amused and surprised to find the superstition, which, in England and Scotland, attaches to the rowan tree, here applied to a tree of nearly similar form. Which nation has been, in this case, the imitator? or from what common centre are all these common notions derived?" (*Bishop Heber.*)

It often happens that the careless observer has for the first time his attention called forcibly to some appearance of nature by accidental circumstances: if at all superstitious, he immediately prognosticates the most disastrous consequences from that which a little more observation would have convinced him was but a phenomenon a little more conspicuous than usual. The northern lights are said to have caused much consternation when first observed; and they have lately been viewed with more than ordinary interest, as it appears from the *Newcastle Chronicle*, that last autumn [1830], when they were more than usually brilliant, some of the inhabitants of Weardale were convinced they saw, on one occasion, very distinctly, the figure of a man on a white horse, with a red sword in his hand, move across the heavens; and are, no doubt, now certain that it foretold the present eventful times. Even this belief may be accounted for on such accidental coincidences, or even philosophically, by assuming as a fact that this phenomenon is the result of an electrical change in the atmosphere, and that such a change usually precedes rain. Now, if such happen in spring or in summer, and before such a quantity of rain as is found to affect the harvest, it may too often betoken scarcity, discontent, and turbulence, as such are the times when all grievances, either real or imaginary, are brought forward for redress. The origin of the superstition of the sailors, of nailing a horse-shoe to the mast, is to me unaccountable, unless it may have been, like the following, a trial of the credulity of the superstitious by some person for amusement. [Sailors sometimes make considerable pecuniary sacrifices for the acquisition of a child's caul (fœtal envelope of the head), the retaining of which is to infallibly preserve them from drowning. — *J. D.*] Some years ago a pretty wide district was alarmed by an account of the beans [*F*àba vulgàris var. equìna] being laid the wrong way in the pod that year, which most certainly foreboded something terrible to happen in a short time, and this produced much consternation amongst those who allow their imaginations to run riot. The whole of the terrible omen was this: the eye of the bean was in the pod towards the apex, instead of being towards the footstalk, as might appear at first sight to be its natural position; and some were scarcely convinced that this was the natural position of the beans in the pod ever since the creation, even on being shown the pod of the preceding year with the seed in the same position.

As yet, however, I fear we must sum up in the words of Davy: — " *Phys.* But how can you explain such absurdities as Friday being an unlucky day; and the terror of spilling salt, or meeting an old woman? *Poiet.* These, as well as the omens of death-watches, dreams, &c., are founded upon some accidental coincidences; but spilling of salt, on an uncommon occasion, may, as I have known it, arise from a disposition to apoplexy, shown by an incipient numbness in the hand, and may be a fatal symptom; and persons dispirited by bad omens sometimes prepare the way for evil fortune; for confidence of success is a great means of insuring it. The dream of Brutus before the battle of Philippi probably produced a species of irresolution and despondency which was the principal cause of his losing the battle; and I have heard that the illustrious sportsman to whom you referred just now was always observed to shoot ill, because he shot carelessly, after one of his dispiriting omens. *Hal.* I have in life met with a few things which I have found it impossible to explain, either by chance coincidences or by natural connections; and I have known minds of a very superior class affected by them *; persons in the habit of reasoning deeply and profoundly." (p. 159.)

I am, Sir, yours, &c.

J. C. Farmer.

Coquetdale, Northumberland, May, 1831.

P.S. In p. 244. of *Salmonia* is an excellent exposure of the tale of the mermaid having been seen in Scotland; and in Butler's *Reminiscences*, vol. ii. p. 103., is given a scene between Sir P. Francis and Burke, which shows the latter's devotion to natural history. — J. C. F.

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* Shakspeare paints Cassius as a character exactly illustrative of this remark, in his *Julius Cæsar*, act v. Cassius, apprehending an unsuccessful issue to the approaching battle of Philippi, thus remarks: —

——— "Messala,
This is my birth-day; as this very day
Was Cassius born. Give me thy hand, Messala:
Be thou my witness, that, against my will,
As Pompey was, am I compell'd to set
Upon one battle all our liberties.
You know, that I held Epicurus strong,
And his opinion: now I change my mind;
And partly credit things that do presage.
Coming from Sardis, on our foremost ensign
Two mighty eagles fell, and there they perch'd,
Gorging and feeding from our soldiers' hands;
Who to Philippi here consorted us;
This morning are they fled away, and gone;
And in their steads do ravens, crows, and kites,
Fly o'er our heads, and downward look on us,
As we were sickly prey; their shadows seem
A canopy most fatal, under which
Our army lies, ready to give the ghost." *J. D.*

ART. II. *Observations on the Zoology and Comparative Anatomy of the Skeleton of the Balænóptera* Rórqual, *or Broad-nosed Whale, now exhibiting at the Pavilion, King's Mews, Charing Cross.* By HENRY WILLIAM DEWHURST, Esq., Surgeon, Professor of Zoology and Comparative Anatomy.

GENERAL HISTORY OF THE WHALE TRIBE.

THE whales constitute a tribe of mammiferous animals which, from their external appearance and peculiar habits of life in their native element, the water, appear at first sight to approach so near to the other kinds of oceanic inhabitants, that it is no wonder the ancient writers on natural history, who were but little acquainted with either the correct history or structure of these creatures, should arrange them as belonging to the class of Fishes.

There are no less than five species of whale which strictly appertain to the genus *B*alæ̀na. There is the same number of species of the dolphin tribe, inhabiting the northern seas; and which have been commonly considered as whales by the public, without paying any attention to their distinguishing characters.

The natural history of the whale is an object well worthy the attention of the philosopher. In all probability it was the whale which gave rise to the fabulous stories of hyperborean monsters; such as the kraken, which has been stated to extend many thousand yards in length, like an immense bank of sand, or a reef of rocks, upon the surface of the water. Such exaggerations are, however, totally unnecessary for the purpose of exciting our wonder; for the animals in question, in their own proper dimensions, are sufficient for our astonishment. Those dimensions, when sufficient time has been allowed for the full developement of the animal, are certainly prodigious: — "There is no doubt," observes Baron Cuvier, "that whales have been seen at certain epochs, and in certain seas, appearing to measure 300 ft. in length, and to weigh more than 300,000 lbs. Among the various species of this genus, occasionally met with at the present day at a considerable distance from the arctic pole, there are some measuring from 70 to 100 ft. long."

It is in the order *C*etàcea that we find the largest animals; and the whale genus alone forms the most stupendous in the whole range of animated nature.

Whales generally congregate in numbers; the male never abandons the female, which suckles her young until the birth of its successor.

The Organ of Smell.—The great developement of the nasal bones, and the power of the organ of smelling, enable these animals to scent odorous bodies at a great distance.*

Non-existence of Teeth in Whales. — Their being devoid of teeth forms a distinctive characteristic of the whales, from the other *Cetàcea* with which they have been popularly allied; but instead of teeth we find a series of laminæ, or layers, of a substance resembling horn, denominated baleen, that has erroneously been called whalebone, and which is supposed to serve to retain their food.†

The Organs of Vision. — The eyes are extremely well adapted for the element which whales inhabit; and it is not a little remarkable that, notwithstanding the immense size of the animal, the whole diameter of each ocular globe does not exceed 3 in.: it is, in fact, about the size of an orange; and, according to Baron Cuvier, the crystalline lens is not larger than a pea, when it is dried. The eyes are placed in the posterior part of the head, in an orbit formed by cartilage and fat; the lower boundary of which is formed of a small process of bone, which connects the lateral portion of the cranium to the bones of the face. The situation of the eyes gives them the facility of perceiving objects both before and behind them, as also any that may be above their heads, when they are below the surface of the water. These organs are guarded by eyelids and eyelashes, as in quadrupeds and other Mammàlia; and from what I have myself witnessed, I should conceive these animals to be extremely quick-sighted, inasmuch as the seamen employed in the whale fishery suppose them to be able to perceive objects under water at a very considerable distance, and believe that the sight of a boat and its oars frightens them exceedingly. In clear water, Captain Scoresby informs us that he has known them to discover each other at an amazing distance. This, however, is certain, that although they are capable of seeing objects through the medium of their native element, yet in the air they are unable to see far; that is to say, when they are lying on the surface of the water; consequently, from this cause, they are easily captured. The eyes are situated almost over the entrance to the ears.

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* On perusing an excellent paper by Mr. Gordon, on the "Analogy between Vegetables and Animals," I observe that he doubts (p. 122.) whether this sense exists in the Cetàcea. The following experiment will, I believe, remove that idea; it is recorded by Count Lacépède, in support of the commonly received opinion, that whales dislike bad odours: — "The Vice-Admiral Pleville-le-Peley, being one day at sea, with his fishers, perceived some whales above the horizon. He prepared to give way to them, but in order to stow away the cod-fish which were in the boat, he ordered a great quantity of putrid and pestiferous water, then in the hold, to be thrown overboard, and the hold itself properly cleaned out; as soon as the stinking water began to spread its noxious odour, the whales instantly made off and disappeared. The Admiral tried this experiment several times, and the results were uniformly the same."

† "The plates of baleen strain the water, which the whale takes into its mouth, and retain the small animals on which it subsists. For this purpose the baleen is in subtriangular plates, with the free edge fringed towards the mouth, the fixed edge attached to the palate, the broad end fixed to the gum, and the apex to the inside arch. These plates are placed across each other at regular distances." (*Fleming's Philosophy of Zoology.*)

The Organ of Hearing.—The organ of hearing is very nearly as acute as those of vision, by which means these animals are warned of any approaching danger. Thus it would seem that the great Author of nature had given them these advantages, as they multiply but little, in order that the species may be preserved. It is true, however, that they have no external ear, and the opening leading to the internal is almost imperceptible; but were this otherwise, it might probably embarrass them in their natural element: but when the delicate external scarf-skin is removed, a black spot is discovered behind the eye, beneath which is the canal leading to the organ of hearing. In short, the whale hears the smallest sounds under water; but above it, Captain Scoresby considers these animals extremely dull of hearing: for a noise in the air, such as is produced by a person loudly shouting, is not noticed when only at the distance of a ship's length; but a very slight splashing in calm water excites its attention, and occasions great alarm. The sailors frequently preserve the internal organ of hearing; the bone composing it is extremely dense, and capable of the highest polish: it is contained, according to M. Dubar, in two bones totally unconnected with the skull, or any of the envelopements of the brain; it is irregular, being united to it by means of firm ligaments. As in man, and other animals, this part is frequently denominated the petrous or rocky bone. Baron Cuvier describes the anatomy of the internal ear, which, according to this eminent zootomist (*Règne Animal*, iv. 414.), presents the following interesting peculiarities:—"From the external orifice there is a narrow cartilaginous tube proceeding to the tympanum or drum of the ear, winding through a bed of fat: this canal pierces the superior maxillary or jaw bone, and terminates above the spiracle or blow-hole in an orifice rendered, by means of a small valve, impenetrable to water. The internal ear is composed, similarly to that of other Mammàlia, of a labyrinth or cochlea, cochlearian orifice, three semicircular canals, a vestibulum and its orifice, a tympanum and its membrane, also articulated osselets placed within the tympanum from its membrane to the vestibulary orifice, a Eustachian tube, with a canal leading from the membrane of the tympanum, and opening to the small external aperture already mentioned."

The Organ of Touch.—No portion of the whale has as yet been discovered by zootomists to which this organ can be referred; yet, from the great maternal protection afforded by this animal to its young, which it carries and preserves under its fins, I cannot believe it to be destitute of this important sense, which is found in every other known animal; besides, the habits and manners of the whale form sufficient evidence in my mind of its existence, and of the great pain it endures when the skin is wounded by the harpoon.

The Embryo Whale.—The young whale, when discovered in its earliest fœtal state, is generally about 17 in. in length, and of a white colour; but the cub when born is black, and varies from 10 to 14 ft., and Baron Cuvier asserts it to be 20 ft., which sometimes may be the case. Generally speaking, only one cub is produced, occasionally two, but never more. When the female suckles her offspring, she throws herself on one side on the surface of the water, and the young whale attaches itself to her breast. They continue suckling for a year, during which time they are named shortheads by the sailors, and yield above 50 barrels of blubber; at two years they are called stunts, and thrive but little when weaned, scarcely affording more than 20 barrels; after this period they are called skull-fish, and their age is wholly unknown.

The Brain.—The brain of the whale is, like the eye, extremely small in proportion to its enormous bulk. Captain Scoresby examined the brain of a whale 19 ft. long, and it weighed only about $3\frac{3}{4}$ lbs., notwithstanding the weight of the animal was near 11,200 lbs. Here the weight of the brain was about $\frac{1}{3000}$ part of that of the entire body, whilst that of an adult man is equal to $\frac{1}{35}$ part of the whole body.*

The Mouth.—This is generally of a serpentine form; the lips are about 20 or 25 ft. long, and display, when open, a cavity sufficiently large to afford a reception to a ship's large jolly-boat and her crew. Duhamel-Dumonceau relates that a whale captured in the bay of Sonsure, in 1726, had a mouth so wide, that, when opened, two men might go in without stooping.

The Baleen or Whalebone.—Teeth, of which the jaws are divested, are substituted in the upper jaw by two rows of laminæ, denominated baleen, erroneously denominated whalebone, or, as Captain Scoresby calls them, fins. They are suspended from the bones named by the seamen the crown-bone, which forms the upper part of the mouth. Each of these laminæ is composed of a species of stiff hair or bristle united longitudinally, and placed side by side. They are connected together at their origin by a species of rabbet, with a peculiar glutinous substance called gum, which is white, fibrous, tender, and tasteless: it also cuts like cheese, and bears some resemblance to the kernel of a cocoa-nut. The laminæ vary in number from 300 to 400 on each side, and are of a bluish black colour.

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* Dewhurst's Dissertation on the Component Parts of an Animal Body, p. 57.

Milk of the Whale.—Dr. Jenner tasted the milk of the whale; and, according to him, it resembles that of most quadrupeds in appearance, and he was of opinion that it is exceedingly nutritious, that it contained more cream, and is rich and well flavoured.

Velocity of the Whale.—Whales descend with immense velocity, and frequently to the depth of 300 or 400 fathoms, and that in the space of five or six minutes; and are capable of ascending in a similar manner, so as to appear as if darting out of the water. When they perform this feat, the whole surface is thrown into the most violent agitation.

Colour of the Whale.—This is generally of a bluish or blackish grey, sometimes they are piebald; the aged animals contain the greatest quantity of greyish matter, mixed with white, whilst the younger are of a bluish black, and sucklings of a pale blue or bluish grey colour.

Quantity of Blood in a Whale.—The quantity of blood which circulates in the whale is much greater than that which circulates in the vessels of quadrupeds. The diameter of the aorta, or large artery arising from the heart, being sometimes more than 13 in.; and the late Mr. John Hunter estimated the quantity thrown into it, at every contraction of the heart, to vary from 10 to 15 gallons, and that with immense velocity. The heart of the whale is broad, flattened, and larger in this animal, in proportion to its size, than in any quadruped, as also are the blood-vessels.

The Pectoral Fins.—The fins are placed on each side of the chest, and contain bones similar to the anterior extremity of the digitated animals, strongly enveloped in strong condensed adipose membrane of a semi-cartilaginous substance. From the peculiarity of structure in the fin, they have received the name of swimming paws from Dr. Fleming, which term is now generally adopted.

Longevity of the Whale.—There are no certain data, on which we can form any accurate idea of the longevity of these enormous animals. It may be presumed, however, that individuals of the larger species may have lived, according to the estimation of Baron Cuvier made respecting the B. *Rórqual* at Charing Cross, more than 1000 years. Should this be any thing like correct, we need not feel surprised that the genius of allegory should adopt the whale as the emblem of duration.

HISTORY OF THE BALÆNÓPTERA *RÓRQUAL.*

Balænóptera, from *balæna*, a whale, and *pteron*, a wing or fin. *Rorqual*, in the Norwegian language, signifies *a whale with furrows*; hence it is very expressive of the distinguishing characteristics of this animal.

The history of the species of whale, whose skeleton I shall shortly proceed to describe, may not be uninteresting to the reader.

On the 4th of November, 1827, some fishermen of Ostend discovered the dead body of a female whale floating in the sea, between the coasts of England and Belgium. Not being able to tow the enormous carcass themselves, the master of the shallop Dolphin of Ostend, who had likewise discerned it, employed the aid of his vessel and crew to move it, but without success. They then called to their assistance two other vessels, and by their united efforts surmounted the difficulty, and were enabled to appear in sight of Ostend at 4 o'clock next day; as soon as they entered the harbour, the rope broke, and it was cast upon the eastern side.

The appearance of a whale of such enormous dimensions created a great sensation; inasmuch as those which had formerly been stranded or captured on the coast of Flanders were of much smaller dimensions, and none had appeared during the present century. These, however, we will briefly notice.

In the year 1178, the magistrates of Bruges offered to Count Philip a sea monster or whale, which had been thrown, in consequence of a great tempest, on the coast of Ostend. This animal measured 42 ft. in length. The formation of the mouth and head is recorded as bearing a resemblance to the beak of an eagle and the figure of a sword.

The chronicles of Flanders report, that, in the month of November, 1402 or 1403, there were thrown eight whales before the port of Ostend: the longest measured nearly 70ft., and produced nearly 24 tons of oil. On the 20th of January, 1762, there was discovered a dead whale, measuring 40 French feet in circumference, on the ride between Blankenberg and Ostend, nearer to the latter city. After having been exposed to the public for five days, it was sold for the benefit of the sovereign, for the sum of 192 Flanders florins (about 16*l.* 13*s.* 4*d.*). Several of these creatures have at different times been killed or stranded upon the British coast. Captain Scoresby has recorded several of these events. One was captured on the coast of Scotland, in the year 1692. Another was 52 ft. long, and had been stranded near Eyemouth, on the 19th of June, 1752. Another, nearly 70 ft. in length, ran ashore on the coast of Cornwall, on the 18th of June, 1797. Three were killed on the north-west coast of Ireland, in the year 1762, and two in 1763. One or two have been killed in the river Thames. Another was embayed and destroyed in Balta Sound, Shetland, in the winter of 1817–18, some of whose remains were seen by Captain Scoresby, who thus states its dimensions:—Length, 82 ft.; lower jaw-bones, 21 ft. each; longest blade of the baleen or whalebone, about 3 ft. Instead of hair at the inner edge and point of each lamina, it had a fringe of bristly fibres, and was stiffer, harder, and more horny in its texture, than the same part in the common Greenland whale. The quantity of oil produced from the blubber of this animal was only about 5 tons, of very inferior quality, some of which was extremely viscid and bad. The total value of the whole, deducting all expenses of extracting the oil, &c., was no more than 80*l.* sterling. It had the usual sulci or furrows about the thorax and dorsal fin.

To return to our Rorqual: M. Herman Kessels of Ostend formed the idea of preserving so valuable an acquisition in zoology and comparative anatomy within the kingdom, instead of allowing it to be made a source of mere pecuniary profit. The perseverance, philanthropy, and enterprising spirit of this gentleman are well known. During the inclement winter of 1827, he contributed to the comforts, health, and happiness of thousands of the indigent of Ostend, by daily distributing food, soup, and warmth among them. To cover the great expenses of this benevolent act, he addressed himself to the wealthy of the town to further his beneficent design, which alone procured him the blessings of all who who had tasted of his bounty. M. Kessels had scarcely formed the idea of preparing the skeleton of this whale ere it was commenced; as he publicly purchased it for the sum of 6230 francs (about 259*l.* 11*s.* 8*d.*), jointly with M. Dubar, an eminent physician of Ostend, on the 16th of November, 1827. From the time the Rorqual was thrown into the harbour, considerable doubt was entertained in the minds of many scientific naturalists as to what species it belonged to; some declaring it a cachalot, others a gibbous whale, &c. &c.

However, from its possessing the longitudinal folds extending from the throat towards the middle of the trunk, it was indicated to be either a Rorqual, or the Finner of the whalers: the latter is the pike-headed whale of Pennant. Various reasons decided it to belong to the former species; but every work by professed naturalists exhibited contrary opinions. Even the illustrious Cuvier himself was in error, inasmuch as he states that all *C*etàcea with folds belong to one and the same species; whereas, according to Count Lacépède, the dorsal fin proved it to belong to the second class of the whale genus, which he has named Balænóptera.

Towards the end of November, 1827, M. Kessels went to Paris, where he consulted Baron Cuvier, and returned with Messrs. Dubar and Paret, the latter an eminent amateur naturalist, on the 20th of December. They had exhibited to this zoologist the whole of the drawings which had been taken of the animal; and he informed them that the Balænóptera *Rórqual* and the Balænóptera *Jubórtes*, which Lacépède and other naturalists had described as two species, were only one and the same; as their distinguishing characters were so trifling that they might be easily confounded with each other. However, M. Dubar, notwithstanding this opinion, determined on considering it a Rorqual in the work which he published on this subject. To whatever species the individual specimen in question belongs, it is doubtless the largest animal that has ever been captured, and I do not hesitate to say that the skeleton is the most perfect in Europe.

The following measurements will give the reader some idea of the bulk of this animal: —

Total length of animal, 95 ft.; breadth, 18 ft. Length of the head, 22 ft.; length of the lower jaw-bones each, 22 ft.; height of the skull, 4½ ft. Length of the spine, 69½ ft.; number of bones composing it, 54. Length of ribs, 9 ft.; number (14 on each side), 28. Length of the fins, 12½ ft. Length of the fingers, 4½ ft. Width of the tail, 22½ ft.; length of the tail, 3 ft.

Weight of the animal when found, 249 tons, or 480,000 lbs.

Weight of the skeleton, only 35 tons, or 70,000 lbs.; being a little less than one seventh of the entire bulk.

Quantity of oil extracted from the blubber, 4000 gallons, or 40,000 lbs.

Weight of the rotten flesh buried in the sand, 85 tons, or 170,000 lbs.

The dissection of this animal commenced under the superintendence of Dr. Dubar, on the 14th of November; in the presence of a great number of medical and other scientific men. The workmen were sixty-two in number, who were employed both day and night; they constructed a wooden house close to the spot. By the 19th the skeleton was dissected out, and deposited in a place prepared for that purpose; but it was not until the 20th of April, 1828, that it was articulated, and fit for exhibition. For this purpose the carpenters commenced on the 14th of January the construction of the pavilion for its reception, the same now at Charing Cross.

When completed, M. Kessels, with the greatest liberality, gave several grand entertainments to the scientific men of the town, as well as to the workmen who had been employed, and likewise to the poor of the town; in fact, there were several days of great rejoicings. Medals of gold were presented from M. Kessels, by the governor, the burgomaster, and by Lieutenant-colonel Dufrenery, commandant of the place, to the heads of the following Societies:—To M. Jacques de Ridder, as president of the Royal Society of Saint Sebastien; to M. Philippe de Brock, president of the Society of Saint Andrew; to M. Aimé Liebaert, president of the Royal Society of Rhetoric, who also received from the same gentleman the fourth medal, which had been offered as a prize to the musical department of the Society.

CLASSIFICATION OF THE WHALE GENUS.

Naturalists of the present day divide these animals into two genera; viz. those which are without the dorsal fin form the true *B*alæ`næ; while those possessing it are, as already stated, placed by Count Lacépède in the second genus, and denominated the Balænóptera.

The Rorqual belongs to the second genus, and may be arranged as follows: —

Class, Mammàlia. Order, *C*etàcea. Tribe, *B*alæ`næ.
Genus, Balænóptera. Spècies, *Rórqual.*

This genus is found not to remain so much to the northward as the common Greenland whale (*B. M*ysticètns), inasmuch as I have already stated its occasional occurrence in the seas about Great Britain, Ireland, Norway, and other nations near the arctic seas; it has also been found in the Mediterranean, near the Straits of Gibraltar. The proportion of oil which whales of this genus and species furnish is not to be compared with that supplied from the *B*alæ`na *M*ysticètus; and the baleen, or whalebone, from its smallness, is not so valuable. These circumstances, together with its great velocity, make this species a matter of indifference to the whalers, who rarely attempt its capture. This protuberance, in conjunction with a series of longitudinal furrows from the throat to the anus, points out the individuals possessing them as either of the kind called pike-headed whale, or Rorquals. Both kinds are discovered near the 75th degree of north latitude. The Rorqual subsists principally upon herrings and smaller fish, and its consumption of these must be immense, when we consider its vast size.

The back of our whale, when captured, was of a blackish hue, and the belly white. The lower jaw is less pointed than those of the other Cetàcea, which is also a distinguishing mark of this genus. The eye is situated near the opening of the posterior part of the lips; and as the condyles [knobs which fit into sockets at joints] of the lower jaw are very high, so that the top of the head is almost on a level with the neck, the visual organs are therefore so contiguous to the top of the head, that they frequently appear above the water, when the Rorqual is swimming on the surface. The pectoral fins are placed at a short distance from the opening of the mouth, and nearly at right angles with the lips when extended. The dorsal fin is situated above the opening of the anus, and is very small in proportion to the size of the animal. The tail is divided into two lobes, with a convexity on the posterior portion of each; the inner margins of each lobe unite directly in the middle, in a line with the termination of the spine.

The inhabitants of Kamtschatka make use of every portion of the Jubarte or pike-nosed whale. The oil serves them partly for fuel, in the preparation of their food, and affords them light. The delicate pieces of baleen, or whalebone, they make into threads for the manufacture of fishing-nets, lines, &c. The lower jaws are used as portions of sledges, handles of instruments, &c.; sometimes the ribs form the framework of their cabins; the nerves answer the purposes of cord; and the various portions of the stomach and intestines form vessels to contain their drink and oil. The skin, which they rudely tan, they form into sandals, bags, and harness.

OBSERVATIONS ON THE ANATOMY OF THE SKELETON.

Having given a brief outline of the zoological characteristics of this whale, I now proceed to make some observations on the anatomy of the skeleton, which, as I have remarked above, is that of a female.

In this skeleton there are several anomalies by which it is rendered peculiar, when contrasted with the other Mammàlia. There are but two distinct kinds of articulation, viz. first, the hinge kind, as in the articulation of the lower jaw with the head; and, secondly, the ball and socket kind, forming the joint of the shoulder, on the articulation of the arm-bone with the scapula, or shoulder-blade. There are none of the movable or the semi-movable articulations. Those I have mentioned possess cartilaginous surfaces, as they do in other animals; and thus the effects of friction are prevented: the other bones are only united by ligaments, which, however, do not form any capsules; they are interosseous, and serve more the purposes of agility than flexibility. The greatest portions of the skeleton are united through the medium of intervening cartilages, even to the fingers, that is, the bones within the pectoral fins. The sutures are imperfectly formed, and in some places the kind of suture termed harmonia can hardly be said to exist; in the head, especially, the union of the bones is so feeble, that they appear nearly disunited.

Most of the bones of these animals are very porous, and contain large quantities of very fine oil. The lower jaw-bones, which measure usually from 20 to 25 ft. in length, are frequently preserved on account of the oil, which can be drained from them when they are conveyed into a warm climate. When this is exhausted, these bones float freely in water. They have very little of the compact substance which usually characterises bones, and in some parts form portions which are denominated *epiphyses*, that are but feebly connected to the other bones; and in the spine thirteen transverse natural processes were found detached from the body of the bone, without any apparent cause. Another peculiarity exists in the articulation of the ribs, which are not united to the bodies of the vertebræ, as in other Mammàlia, but are connected through an intervening cartilage to the transverse processes of the dorsal vertebræ. This portion of the skeleton is pretty nearly solid.

According to the observations of Sir Charles Giesecké, the *B*alæ̀na *M*ysticètus, or common whale, possesses thirteen ribs on each side; whilst in the B. *Rórqual* there are fourteen. An additional distinguishing character in the Rorqual is the circumstance of there being at the muzzle a few small blades of baleen, or whalebone, a character not found in any other species of the whale genus, with a small bristly tuft, like the mane of a horse, only much firmer in texture. This important feature in this animal is finely preserved in the skeleton. This fact has neither been mentioned by Pennant nor Cuvier, and the Rorqual in Lacépède's *Hist. Cetac.* is any thing but a true representation. There are no abdominal or hind limbs in any of these animals; neither is there any vestige of pelvis, with the exception of a small portion of bone analogous to the ossa pubis of quadrupeds.

The Head. — This portion of the whale bears some resemblance to a pyramid lying on its side, the point or apex being in the front, and the base attached to the spine. We may not improperly divide, for the purpose of description, the head into five surfaces, viz. a superior, an inferior, a posterior, and two lateral. The superior surface is of a triangular shape; ngth being about 25 ft. : it is terminated anteriorly by the muzzle or extremity of the palatine bones; and posteriorly by the vault of the skull, which is occupied by the brain, and is distinguished by the frontal bone, which, passing in a semilunar direction, terminates in a process that contributes to form the anterior portion of the zygomatic arch; thus exhibiting an analogy to quadrupeds. From the top and anterior part of the frontal bone the nasal bones are articulated by sutures, and extend the whole length of the upper part of the mouth. Beneath these are two vomeres [ploughshare bones], forming two thin osseous laminæ, and these are closely connected to the inferior part of the frontal bone.

The superior surface of the palatine bones may be perceived externally, and they are of a more spongy texture than the preceding. They are of a triangular form, and are curved at the external margin. Towards the posterior part there are five or six large foramina [orifices], which afford a passage for the nutritive arteries, &c. Between the above bones there is a large space left in the upper part of the mouth, which affords a lodgment to the ethmoidal bone [a bone that, in the superior part of the human nose, resembles a sieve]; and also for the spiracles, through which the animal ejects water; and these are popularly denominated the blow-holes. The ethmoidal bone is placed in the cavity formed by the nasal bones, and by which it is concealed: it is light, spongy, and formed of thin laminæ.

The lateral surfaces of the skull are likewise nearly triangular, and extend superiorly only to the sides or parietes [walls] of the nose; presenting several furrows which afford a lodgement to several important blood-vessels and nerves. The use of these bones is to augment the nasal cavity; they are lined by a dense, thick, olfactory membrane, in which the organ of smell is situated.

The inferior surface, like the rest, is triangular, and is mostly formed by the principal part of the palatine bones, and likewise possesses a great number of furrows and canals which afford a passage to the nutritive vessels and nerves; in the exterior boundary there is a sulcus [furrow], which indicates the place where the baleen or whalebone is inserted. At the posterior part of this surface, and between the mastoid processes [processes of the neck bone, shaped like the nipple of the breast], the two bones containing the organ of hearing, denominated the petrous, or, as I term them, the acoustic bones, are placed. In the interior there is a nervous pulp, in which the sense of hearing is supposed to reside.

The posterior surface or base of the skull is of a semicircular form, with two large alæ or wings on its sides, at the bottom of the pterygoid [wing-like] processes of the sphenoidal [wedge-like] bone. There are the humular or hook-like processes, to which the pharynx [upper part of the gullet] is attached. The great occipital foramen [orifice in the back of the head] for the passage of the spinal marrow from the brain, is situated a little above the preceding. On each side of this foramen [orifice] there are the semilunar condyles [knobs] of the occipital [hind head] bone, which are articulated with the atlas [the first bone of the neck] as in the other Mammàlia. The remainder of this portion of the skull is occupied by the greater part of the occipital and the mastoid processes.

The lateral surfaces are formed by the end of the palatine bones anteriorly; the zygomatic fossa [cavity] and its arch posteriorly. This surface embraces portions of the temporal, occipital, and the sphenoidal bones.

On viewing the head vertically, we find several interesting peculiarities; the occipital bone measures more than 3 ft. in thickness, and is very spongy in its texture, whilst the external table is at the same time extremely thin; consequently the specific gravity must be very little, notwithstanding its immense size. The nasal cavities are very largely developed, and in the living animal not only contain the olfactory membrane, but likewise the spiracles, or organs by means of which the whale is enabled to project water to a considerable height above the surface of the ocean. The cerebral cavity, when contrasted with the dimensions of the other portions of the body, is extremely small; beneath it is the point of union of the vomer with the occipital and part of the ethmoidal bones. With the exception of the lower jaw-bones, all those composing the head are of a spongy nature, and appear to be formed of a series of laminæ. The lower jaw, like the same portions of other animals, and of the human infant at birth, is formed of two distinct pieces of bone, united together at the point or chin by symphysis, or a thin layer of intervening cartilage; each one forms a curve terminating in its condyle, and measures 22 ft. in length from the chin to its articulation with the bones of the head. It is extremely hard and compact; the coronoid process which is separated from the condyles by an almost horizontal space, which occupies the place of a semilunar cavity found in the other Mammàlia, affords insertion to the temporal muscle. They articulate themselves with the glenoid cavities of the occipital bone, in such a manner as to form a perfect hinge joint. The superior margins of these bones are perfectly smooth, and exhibit not the slightest vestige of any alveolar cavities for teeth, which are found in several genera of the order *Cetàcea.*

There is a number of large foramina on the labial surface of these bones, for the passage of large blood-vessels. The anterior mental foramen is placed externally near the chin, and is sufficiently large to admit a man's thumb: this leads to a large canal, which traverses the body of the bone; it contains blood-vessels and nerves, which, having performed their important duties in nourishing the bone, pass out by another large hole on the inside of a hole that is situated about 2 ft. from the back of the condyle.

The Os Linguale, or Bone of the Tongue. — This is of a triangular shape, and its appendages make it appear an immense volume of bone; it is situated between the shoulders, and above the bones forming the sternum [bone of the chest or breast]. The body of this lingual bone is curved in its form, the convexity of which projecting anteriorly, its inferior margin is crescent-shaped. There is to be observed a semilunar cavity at its smallest part, which, with the cartilages and ligaments, aids in the living animal towards forming the cavity of the throat. On its sides are some asperities, which give attachment to some of its powerful ligaments, &c. The top contains a deep sulcus [furrow], likewise lined with a similar surface, for the purpose of allowing origin and insertion to the muscles of deglutition. The bony appendages of this bone are two in number, and are articulated by means of loose ligaments to two extremities of the lingual bone. They are curved throughout their length, the convexity approaching inwards, where is a large and almost circular space in their upper part, that in the living animal contains enormous masses of fat. The remainder of these appendages are smooth, and appear only to give connection to a few muscular fibres.

THE STRUCTURE OF THE SPINE.

This portion of the skeleton is composed of fifty-four bones, and, with the head, forms a length which at first sight seems impossible to have belonged to an animated being, did we not know the creative power of an almighty and wondrous God.

As in most of the other Mammàlia, we can divide the bones of the spine into four series: cervical, dorsal, lumbar, and caudal.

Of the Vertebræ or Bones of the Neck. — The first three of these have no spinal processes; but it appears, from its projecting from the cranium, that the spinal marrow passes from the brain into its proper canal, which is formed by the three lateral processes of the first three bones of the neck. (" Formé par des apophyses latérales des trois premières cervicales." *Dubar.*) This, it is to be observed, is only a supposition of the superintendent of the dissection, M. Dubar, who states that the soft parts were in such a state of decomposition, that it was almost impossible to distinguish it. The true spinal canal commences at the fifth cervical vertebra, and extends nearly to the last caudal vertebra, being lost at the fifty-fourth.

This canal is formed of a triangular shape, by a series of spinous processes which make the arch on the bodies of the bones composing the spine, for the reception of the spinal marrow.

The Atlas, or the first Bone of the Neck. — The anterior surface presents two articular fossæ [cavities] for the reception of the condyloid processes [knobs] of the occipital bone, and is the means of the head articulating upon the trunk; superiorly and laterally there are two canals capable of receiving the human little finger, which give passage to the vertebral vessels. The two transverse processes are tuberose and asperated [roughened], for the attachment of the adjacent muscles and lateral ligaments, permitting the head to perform the various motions intended for it by the great Author of nature. The posterior surface of this bone exhibits nothing beyond a few irregularities by which it is attached to the bone behind it. There is no hole or foramen in the transverse process of the atlas, for the passage of blood-vessels and nerves.

The second Bone of the Spine is of a curious yet regular shape, presenting an oval figure, the great diameter of which is transverse. This bone has no spinous, but has two enormous transverse processes; each of which possesses a very large foramen, which exceeds that of the occipital bone by twice its diameter. The third, fourth, and fifth cervical vertebræ have double transverse processes, so that they do not, as in the second, form a complete foramen or hole; and the fifth exhibits the rudiments of a spinous process. The sixth forms a curve on its body, that, when united, has its convexity downwards.

The Bones of the Back. — These are fifteen in number, although the ribs are but fourteen on each side; the first of which, being bicipital [two-headed], is united to the first two dorsal vertebræ. The transverse processes have at their extremity an articulating surface for the union of the ribs — a phenomenon peculiar to these animals; and, consequently, the motions of the ribs must be somewhat limited. The bodies and processes of these vertebræ are very large, and in substance they are more dense and compact than the other vertebræ; which may be supposed to be thus made stronger

"By Him who never errs,"

in consequence of their having to support the whole weight of the chest, with the heart, lungs, &c. &c.; together with the fins or swimming paws, and shoulder bones. This portion of the spine is curved, the convexity is upwards: by this means the cavity of the chest is greatly enlarged.

The Bones of the Loins are sixteen in number, and bear considerable resemblance to the preceding, and are without any articulating surfaces; but it may be here observed, that there exists not the slightest vestige of any abdominal limbs: and there are found attached to these bones, by means of muscles, two little bones, forming the ossa pubis; and this forms the only vestige of a pelvis. But I shall revert to this subject presently.

The caudal Vertebræ, or those approaching towards the tail, are eighteen in number, and have bony appendages at their inferior surfaces, with the exception of the eight nearest to the tail where the appendages disappear. This portion of the spine tapers towards the extremity; and, where it joins the tail, it exhibits a slight curve, the convexity of which is placed inferiorly.

Of the Ribs. — These are fourteen on each side, and form the walls of the chest. The structure of these bones is dense, firm, and compact; which, with their size and thickness, renders the animal capable of resisting the most violent shocks: with the exception of the first, which is almost vertical, the others take a more posterior direction. The head of the first rib is double, and articulated with the transverse processes of the seventh and eighth vertebræ by means of tubercles received into the articulated fossæ [cavities] of the vertebræ. The dimensions of this rib are very considerable, and the sternal extremity of it is much larger than the sternum itself. There is but one actual sternal rib on each side which is fairly articulated with the sternum; whilst the others are, as in most other Mammàlia, connected to that bone by a thick and powerful intervening cartilage, of which only the first five pair are real true ribs, and form any attachment to the sternum: the others are united to each other as the false ribs usually are, and the last three are not connected at all; consequently, we not improperly denominate them floating ribs. The fourth rib is the longest, and measures 9 ft. in length; the others gradually diminish as they approach the fourteenth, which is the smallest. The appearance of the chest as a whole will give the spectator a very good idea of the framework of a small sailing vessel; and it is impossible to form any accurate idea of the dimensions of this cavity, without making an examination of the interior: there only it is that a true conception can be formed.

The Sternum or Breast-bone. — This bone, when contrasted with the immense dimensions of the chest, is very small and spongy in its texture; and the layer of compact osseous tissue covering it is so thin as hardly to be perceived. The shape bears some rude resemblance to a cross, the apex or top of which is carried forward. This bone gives attachment to the first rib on each side, and is composed of three bones connected by cartilage. It has two plain surfaces, and exhibits nothing else worth mention.

The Bones of the Pelvis. — The pubic bones, which I have already cursorily mentioned, may not unaptly be considered as appendages of the spine. They are extremely small, and each has somewhat a triangular shape; but one of the angles is elongated upwards, and they bear altogether no small resemblance to the marsupial bones found in the kangaroo and other animals of New Holland, &c. They are found floating in the muscular walls of the abdomen; and the only connection they have with each other is by a very loose ligament. From their position, they, as far as we can perceive, can be of very little service to the animal, inasmuch as they neither possess size nor strength sufficient to protect the generative organs, or to guard, during the pregnant state, the fœtus within. However, there is not the least doubt but these bones must answer some important purpose in the animal economy, else the allwise Architect of the universe would never, in his wisdom, have constructed an organ insubservient to some useful function.

THE ANATOMY OF THE THORACIC EXTREMITIES, OR PECTORAL FINS.

The whale being deprived of clavicles, or collar bones, the pectoral fins are composed of the shoulder-blades, and what are, strictly speaking, the pectoral fins.

The Scapula or Shoulder-blade. — This is placed on part of the last cervical vertebra, and partly on the first dorsal, which it partly covers; it is a very large bone, of which the superior part is semicircular, and the inferior nearly quadrangular. The external surface is extremely smooth: there is no spinous process; but one, analogous to the acromion process of other animals, projects about 15 in. beyond the neck of the scapula.

This must afford attachment to some of the muscles; the remaining muscles must form connections with the smooth surface, or with the superior margin of the bone.

The costal or internal surface has several strongly marked prominences and canals, which diverge towards the semicircular margin. These canals are evidently produced by the ribs during the fœtal or infantile state of the animal. The superior semicircular margin has several strongly marked asperities, where several very powerful muscles are inserted. The anterior margin, which is the shortest, is likewise the thickest at the inferior part of this, and at the anterior angle; the coracoid process [resembling a crow's beak], and the one analogous to the acromion just described, both of them projecting anteriorly, are separated by a very deep canal, which, in the recent state, is filled up with a very fat cellular tissue. The glenoid or articular cavity of the shoulder joint is found at the anterior margin of this bone: it is very flat, and there appears to be no attachment of the scapulo-humeral ligament, from which the animal enjoys motion at this part to a greater extent than the other Mammàlia; for the head of the brachium or arm-bone, which is enormous, can ultimately employ all its surfaces; in fact, it can describe full two thirds of a sphere. Besides, the pectoral extremity not being controlled by a clavicle, its actions are less likely to be limited. This is the largest flat bone in the skeleton, next to those of the head; its structure is rather spongy, being only covered with a thin layer of dense substance. The fins contain bones analogous to the superior extremities in man, which I proceed to describe.

The Os Brachii, or Arm-bone, is short, but thick; the head is directed obliquely from outwards to inwards, where it articulates itself with the glenoid cavity of the shoulder-blade by means of a smooth and even articular cartilage; its cubital extremity is almost flat, and is articulated by simple ligaments to the radius and ulna. All the external surface of this bone is asperated, for the insertion of the muscles of the shoulder, and also of those which give motion to the fin.

Of the Bones of the Forearm. — The radius is flat, larger and thicker than the ulna, and offers no striking peculiarity, except the hardness of its compact tissue. Its articulation with the body is the same as with the ulna. *The Ulna, or Cubitus*, forms the inferior margin of the forearm; it is flat but curved through all its length: at the brachial extremity is a flattened tuberose process, which gives origin to strong tendons passing to the extremity of the fingers. The carpal extremity is united to the hand by a powerful tendinous substance: all the body of the bone has externally a dense compact tissue of ossific matter. *The interosseous Space*, or cavity, between the radius and ulna, is very narrow; it has a very thick membrane, not unlike a piece of leather.

The Carpus, or Wrist. — This is composed of six large bones; some in the form of a cube, others in that of a cylinder. They appear to have no articulated surfaces; but, on the contrary, are at very great distances from each other, and seem as though they were fixed in a thick tendinous substance, which envelopes them on all sides; so that, to preserve these bones in their natural state, it was impossible for M. Dubar to pay any attention to their particular shape.

The Metacarpus, or Hand, is composed of four long and thick bones, the two middle ones bearing a resemblance, but not in magnitude, to the thigh-bones of an ox; and, with the exception of the index, the three others are united to one and the same bone. They are slightly curved, and are of an equal thickness throughout.

The Fingers.—The fingers are four in number, and the two smallest are the longest and strongest. The first, or the index, has four phalanges; the second, seven; the third, six; and the fourth, five; each having a space for a nail.

These bones or phalanges are independent of those forming the metacarpus. All of them are separated from each other by long tendinous ligaments, which are very flexible. Thus we find great strength within a small space in this limb, because it was there required: thus illustrating the beauty of Providence, in accommodating every part to the office it is designed to perform.

Of the Construction of the Tail. — The manner in which this tremendous and only weapon of defence belonging to this animal is constructed is as beautiful in its mechanism as any other part of the animal. It is wholly composed of three layers of tendinous fibres, covered by the common cutis and cuticle; two of these layers are external, and the other internal. The direction of the fibres of the two external layers is the same as in the tail, forming a stratum about one third of an inch thick; but varying, in this respect, as the tail is thicker or thinner. The middle layer is composed entirely of tendinous fibres, passing directly across, between the two external ones above described, their length being in proportion to the thickness of the tail: a structure which gives an amazing degree of strength to this part. The substance of the tail is so firm and compact that the blood-vessels retain their dilated state even when cut across; and this section consists of a large vessel surrounded by as many small ones as can come into contact with its external surface: but which of are arteries, and which veins, has not been ascertained.

General Remark. — The whale is of those animals that (no matter which species) was once considered worthy to grace the royal table, some portions having been prepared in the most savoury manner for the royal banquets: and historical records inform us, that, in ancient times, when a whale was thrown on any of the British coasts, the spoil was divided between the king and queen; the king asserting his claim to the head, and Her Majesty to the tail. Several statutes vest the property of a whale caught on the coasts or seas of Great Britain and Ireland in the person of His Majesty, who is, however, to give a proper remuneration to all persons who may be concerned in the capture of such a valuable prize.

8. *Gower Place, London University.*

A short notice of the individual whale, which forms the theme of the preceding paper, will be found in our Number for September, 1828, Vol. I. p. 283. A notice of a male spermaceti whale, captured on the coast of Kent on the 16th of February, 1829, occurs in Vol. II. p. 197—202. The capture of a beak-nosed whale, on the coast near Liverpool, noticed in the end of April, 1829, is recorded Vol. II. p. 391. A useful remark on the structure of the hands of the whale is given Vol. II. p. 457., where it is observed that their flatness, pliancy, great size, and strength, enable the whale to sustain the young closely compressed to its body, as was remarked by Aristotle. An engraving of the species of whale denominated *P*hysèter catòdon, is given in Vol. II. p. 477. fig. 114. Short descriptive notices of two whales captured on the coast of Norfolk, one in March, 1822, the other on Nov. 23. 1829, and also a notice of a third seen spouting off Cromer, Norfolk, in the autumn of 1822, will be found in Vol. III. p. 157. In Vol. IV. p. 163. a short description of one found dead in the Channel, near Brighton, on Dec. 29. 1830, also occurs: this measured 63 ft. in length. And a figure, and a general as well as technical description, of a grampus (*D*élphinus *O*'rca), a species of cetaceous animal, captured in Lynn Harbour on the 19th of November, 1830, will be found in our Vol. IV. p. 339.—*J. D.*

Art. III. *On the Faculty of Scent in the Vulture.*

By Charles Waterton, Esq.

"Et truncas inhonesto vulnere nares." *Æneid.* lib. vi.
"And nose demolish'd by a shameful blow."

I never thought that I should have lived to see this bird deprived of its nose. But in the third number of *Jameson's Journal*, a modern writer has actually given "An account of the habits of the Turkey-Buzzard (*V*últur Aúra), with a view of exploding the opinion generally entertained of its extraordinary power of smelling;" and I see that a gentleman in your Magazine (Vol. III. p. 449.) gives to this writer the honour of being the first man who, by his "interesting treatise," caused the explosion to take place.

I grieve from my heart that the vulture's nose has received such a tremendous blow; because the world at large will sustain a great loss by this sudden and unexpected attack upon it. Moreover, I have a kind of fellow-feeling, if I may say so, for this noble bird. We have been for years together in the same country; we have passed many nights amongst the same trees; and though we did not frequent the same mess, (for "de gustibus non est disputandum," ["there is no disputing about tastes,"] — and I could not eat rotten venison, as our English epicures do,) still we saw a great deal of each other's company.

Sancho Panza remarks that there is a remedy for every thing but death. Now, as the vulture has not been killed by the artillery of this modern writer in *Jameson's Journal*, but has only had its nose carried away by an explosion, I will carefully gather up the shattered olfactory parts, and do my best to restore them to their original shape and beautiful proportions. In repairing the vulture's nose, I shall not imitate old Taliacotius, who, in times long past and gone, did

——— "from
The brawny part of porter's bum
Cut supplemental noses, which
Would last as long as parent breech;"

but I will set to work upon my own resources, and then the reader shall decide whether the vulture is to have a nose, or to remain without one.

We all know what innumerable instances there are, in every country, of the astonishing powers of scent in quadrupeds. Thus, the bloodhound will follow the line of the deer-stealer hours after he has left the park; and a common dog will ferret out his master in a room, be it ever so crowded. He is enabled to do this by means of the well-known effluvium which, proceeding from his master's person, comes in contact with his olfactory nerves. A man even, whose powers of scent are by no means remarkable, will sometimes smell you a putrid carcass at a great distance. Now, as the air produced by putrefaction is lighter than common air, it will ascend in the atmosphere, and be carried to and fro through the expanse of heaven by every gust of wind. The vulture, soaring above, and coming in contact with this tainted current, will instinctively follow it down to its source, and there find that which is destined by an all-wise Providence to be its support and nourishment.

I will here bring forward the common vulture of the West

Indies, the *V*últur Aúra of Guiana, the king of the vultures of Terra Firma, and the vulture which is found in European Andalusia. I am intimately acquainted with all these useful scavengers; and I have never known any of them to kill the food upon which they feed; or when they are in a complete state of nature, free from the restraint or allurements of man, ever feed upon that which was not putrid. Having slain the large serpent mentioned in the *Wanderings*, though I wished to preserve the skeleton, still I preferred to forego the opportunity, rather than not get the king of the vultures. I called Daddy Quasshi, and another negro, and we carried the body into the forest. The foliage of the trees where we laid it was impervious to the sun's rays; and had any vultures passed over that part of the forest, I think I may say, with safety, that they could not have seen the remains of the serpent through the shade. For the first two days, not a vulture made its appearance at the spot, though I could see here and there, as usual, a *V*últur Aúra gliding, on apparently immovable pinion, at a moderate height, over the tops of the forest trees. But, during the afternoon of the third day, when the carcass of the serpent had got into a state of putrefaction, more than twenty of the common vultures came and perched upon the neighbouring trees, and the next morning, a little after six o'clock, I saw a magnificent king of the vultures. There was a stupendous mora tree * close by, whose topmost branch had either been dried by time or blasted by the thunder-storm. Upon this branch I killed the king of the vultures, before it had descended to partake of the savoury food which had attracted it to the place. Soon after this, another king of the vultures came, and after he had stuffed himself almost to suffocation, the rest pounced down upon the remains of the serpent, and stayed there till they had devoured the last morsel.

I think I mentioned, in the *Wanderings*, that I do not consider the *V*últur Aúra gregarious, properly so speaking; and that I could never see it feeding upon that which was not putrid. Often, when I had thrown aside the useless remains of birds and quadrupeds after dissection, though the *V*últur Aúra would be soaring up and down all day long, still it would never descend to feed upon them, or to carry them off, till they were in a state of putrefaction.

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* Among various interesting extracts from the *Wanderings* lying by us, we have one on the mora tree, which we beg here to append as a note. —*J. D.*

The Mora, in Guiana, is a lofty timber tree, the topmost branch of which, when naked with age, or dried by accident, is the favourite resort of the toucan. It also frequently happens that a wild fig tree, as large as a common English apple tree, rears itself from one of the thick branches of the top of the mora, and that numerous climbing epiphytes grow upon the fig tree. The fig tree, in time, kills the mora, and the epiphytes the fig tree. The birds are the agents that convey the seeds to the rotten hollow stump, or decaying bark of the mora and fig. (*Waterton's Wanderings in South America, &c.*)

Let us here examine the actions of this vulture a little more minutely. If the *V*últur Aúra, which, as I have said above, I have never seen to prey upon living animals, be directed by its eye alone to the object of its food, by what means can it distinguish a dead animal from an animal asleep? or, how is it to know a newly dead lizard or a snake, from a lizard or a snake basking quite motionless in the sun? If its eye be the director to its food, what blunders must it not make in the negro-yards in Demerara, where broods of ducks and fowls are always to be found, the day through, either sleeping or basking in the open air. Still, the negro, whom habit has taught to know the *V*últur Aúra from a hawk, does not consider him an enemy. But let a hawk approach the negro-yard, all will be in commotion, and the yells of the old women will be tremendous. Were you to kill a fowl, and place it in the yard with the live ones, it would remain there unnoticed by the vulture as long as it was sweet; but, as soon as it became offensive, you would see the *V*últur Aúra approach it, and begin to feed upon it, or carry it away, without showing any inclination to molest the other fowls which might be basking in the neighbourhood. When I carried Lord Collingwood's despatches up the Orinoco, to the city of Angustura, I there saw the common vultures of Guiana nearly as tame as turkeys. The Spaniards protected them, and considered them in the light of useful scavengers. Though they were flying about the city in all directions, and at times perching upon the tops of the houses, still many of the people, young and old, took their siesta [afternoon's nap] in the open air, " their custom always of the afternoon," and had no fear of being ripped up and devoured by the surrounding vultures. If the vulture has no extraordinary powers of smelling, which faculty, I am told, is now supposed to be exploded since the appearance of the article in *Jameson's Journal*, I marvel to learn how these birds in Angustura got their information, that the seemingly lifeless bodies of the Spaniards were merely asleep, —

" Dulcis et alta quies, placidæque simillima morti,"
" Sweet sleep, and deep, and like to placid death,"—

and were by no means proper food for them.

Some years after this, being alongside of a wood, I saw a negro on the ground; and, as I looked at him from a distance, it struck me that all was not right with him. On going up to him, I found him apparently dead. Life was barely within him, and that was all. He was a total stranger to me; and I conjectured that he had probably been seized with sickness as he was journeying on, and that he had fallen down there to rise no more. He must have lain in that forlorn, and I hope insensible, state for many hours; because, upon a nearer inspection, I saw swarms of red ants[*] upon him, and they had eaten deeply into his flesh. I could see no marks that the vultures had been upon him. Indeed, their not being here caused me no surprise, as I had long been satisfied, from the innumerable observations which I had made, that the vulture is attracted to its food by the putrid exhalations which arise from it, when it has arrived at that state of decomposition which renders it fit, and no doubt delicious, food for this interesting tribe of birds. While I was standing near the negro, I could see here and there a Vúltur Aúra sweeping majestically through the ethereal expanse, in alternate rises and falls, as they are wont to do when in search of carrion; but they showed no inclination to come and perch on the trees, near the prostrate body of this poor unknown sable son of Africa.

The terrible pestilence which visited Malaga at the beginning of the present century, swept off thousands upon thousands in the short space of four months. The victims were buried by the convicts. So great was the daily havoc of death, that no private burials could be allowed; and many a corpse lay exposed in the open air, till the dead-carts made their rounds at nightfall, to take them away to their last resting place, which was a large pit, prepared for them by the convicts in the daytime. During this long-continued scene of woe and sorrow, which I saw and felt, I could never learn that the vultures preyed upon the dead bodies which had not had time enough to putrefy. But when the wind blew in from the Mediterranean, and washed ashore the corrupted bodies of those who had died of the pestilence, and had been thrown overboard from the shipping; then, indeed, "de montibus adsunt Harpyiæ;" then it was that the vultures came from the neighbouring hills to satisfy their hunger; then, one might have said of these unfortunate victims of the pestilence, —

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[*] We have the happiness to find another of our extracts applicable as an appropriate note. — *J. D.*

The Red Ant of Guiana marches in millions through the country, in compact order, like a regiment of soldiers. They eat up every insect in their march; and, if a house obstruct their route, they do not turn out of the way, but go quite through it. Though they sting cruelly when molested, the planter is not sorry to see them in his house; for it is but a passing visit, and they destroy every kind of insect vermin that had taken shelter under his roof. (*Waterton's Wanderings in South America, &c.*)

> "Their limbs, unburied on the naked shore,
> Devouring dogs and hungry vultures tore."

In Andalusia, one day in particular, I stood to watch the vultures feeding on the putrid remains of a mule, some ten miles from the pleasant village of Alhaurin. Both kids and lambs were reposing and browsing up and down in the neighbourhood, still the vultures touched them not; neither did the goatherds seem to consider their flocks as being in bad or dangerous company, otherwise they might have despatched the vultures with very little trouble; for they were so gorged with carrion that they appeared unwilling to move from the place. Now, seeing some of the kids and lambs lying on the ground quite motionless, and observing that the vultures paid no attention to them, I came to the following conclusion, viz. that the vulture is directed to its food by means of its olfactory nerves coming in contact with tainted effluvium floating in the atmosphere; and this being the case, we may safely infer that the vulture cannot possibly mistake a sleeping animal for one in which life is extinct, and which has begun to putrefy.

If the vulture were directed to its food solely by its eye, there would be a necessity for it to soar to an immense height in the sky; and even then it would be often at a loss to perceive its food, on account of intervening objects. But I could never see the vulture rise to any very astonishing height in the heavens, as is the custom with the eagle, the glede, and some other birds of prey; and I am even fully of opinion, that, when these last-mentioned birds soar so high, they are not upon the look-out for food. When looking at the vultures aloft, I could always distinguish the king of the vultures from the common vulture, and the common vulture from the *V*últur Aúra. Sometimes, an inexperienced observer, in Guiana, may mistake for vultures a flock of birds soaring to a prodigious height in the sky: but, upon a steady examination, he will find that they are Nandapoas.

I conceive that we are in error when we suppose that birds of prey rise to such an astonishing height as we see them do, in order to have a better opportunity of observing their food on the ground below them. I have watched gledes and hawks intensely, when they have been so high that they appeared a mere speck in the azure vault; still, when at such a great height, I have never been able in one single instance to see them descend upon their prey, during the many years in which I have observed them. But, on the other hand, when birds of prey are in quest of food, I have always seen them fly at a very moderate height over the woods and meads, and strike their victim with the rapidity of lightning. Thus, the kestrel hovers at so comparatively short a distance from the earth, that he is enabled to drop down upon a mouse, and secure it as quick as thought. Thus the merlin and sparrowhawk, a little before dark, shoot past you when you are watching behind a tree, with inconceivable velocity, and snatch away the unsuspecting bunting from the hedge. But when food seems not to be the object, especially about the breeding season, you may observe the windhovers rising in majestic evolutions to a vast altitude; but, if you watch till your eyes ache, you will never see them descend upon their prey from this immense height: indeed, the great distance to which they rise would operate much against them in their descent to seize their food. For example, suppose a mouse to be on the ground, exactly under a hawk, which hawk is so high up that its appearance to the observer's eye is not larger than that of a lark, how is the hawk to take the mouse? If it descend slowly, the wary mouse would have time to get into its hole; if the hawk come down rapidly, the noise it causes in darting through the expanse would be a sufficient warning to the mouse to get out of the way. In order to have a proper idea of the noise which the descent of the bird would cause, we have only to listen to a rook in the act of what the peasants call shooting, and which, by the by, they always consider as a sign of coming wind; though, in fact, it can easily be accounted for without any aid from conjecture. It might here be asked, for what object, then, do many birds of prey rise to such an amazing height in the sky? I answer, I know not. Why does the lark mount so high, and sing all the time? His female and other listeners on the ground would hear him more distinctly and clearly, were he to pour forth his sweet and vernal notes nearer to them.*

But to return to the vulture. After the repeated observations I have made in the country where it abounds, I am quite satisfied that it is directed to its food by means of its olfactory nerves coming in contact with putrid effluvium, which rises from corrupted substances through the heavier air. Those are deceived who imagine that this effluvium would always be driven to one quarter in the tropics, where the trade-winds prevail. [Vol. II. p. 473.] Often, at the very time that the clouds are driving from the north-east up above, there is a lower current of air coming from the quarter directly opposite. This takes place most frequently during the night-time, in or near the woods; and it often occurs early in the morning, from sunrise till near ten o'clock, when the regular trade-wind begins to blow. Sometimes it is noticed in the evening, after sunset; and, now and then, during the best part of the day, in the rainy season. In Guiana there is a tree called hayawa: it produces a deliciously smelling resin, fit for incense. When the Indians stop on the banks of a river for the night, they are much in the habit of burning this resin for its fine and wholesome scent. It is found in a hardened lumpy state, all down the side of the tree out of which it has oozed. It is also seen on the ground, at the foot of the tree, incorporated with the sand. When we had taken up our nightly quarters on the bank of the Essequibo, many a time we perceived this delightful fragrance of the hayawa, which came down the bed of the river to the place where we were, in a direction quite opposite to the trade-wind. My Indians knew by this that other Indians were encamped for the night on the river-side above us.

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* "Is it for thee the lark ascends and sings?
Joy tunes his voice, joy elevates his wings.
Is it for thee the linnet pours his throat?
Loves of his own and raptures swell the note."
Pope's Essay on Man, epistle iii. — *J. D.*

When the eruption took place in the Island of St. Vincent, in the Caribbean Sea, in 1812, cinders and other minor particles of matter were carried nearly, if not fully, 200 miles to windward, and were said to have fallen at or near Barbadoes. Had there been a carcass, in a state of decomposition, at the place during the time of the eruption, no doubt the effluvium arising from it would have been taken to windward by a temporary counter-aerial current; and a vulture in Barbadoes might probably have had pretty certain information, through his olfactory nerves, that there was something good for him in the Island of St. Vincent.

Vultures, as far as I have been able to observe, do not keep together in a large flock, when they are soaring up and down apparently in quest of a tainted current. Now, suppose a mule has just expired behind a high wall, under the dense foliage of evergreen tropical trees; fifty vultures, we will say, roost on a tree a mile from this dead mule; when morning comes, off they go in quest of food. Ten fly by mere chance to the wood where the mule lies, and manage to spy it out through the trees; the rest go quite in a different direction. How are the last-mentioned birds to find the mule? Every minute carries them farther from it. Now, reverse the statement; and, instead of a mule newly dead, let us suppose a mule in an offensive state of decomposition. I would stake my life upon it, that not only the fifty vultures would be at the carcass next morning, but also that every vulture in the adjacent forest would manage to get there in time to partake of the repast.

Here I will stop, fearing that I have already drawn too largely on the reader's patience; but really I could not bear to see the vulture deprived of the most interesting feature in its physiognomy with impunity. These are notable times for ornithology: one author gravely tells us that the water ousel walks on the bottom of streams; another describes an eagle as lubricating its plumage from an oil-gland; a third renews in print the absurdity that the rook loses the feathers at the base of the bill by seeking in the earth for its food; while a fourth, lamenting that the old name, *C*aprimúlgus, serves to propagate an absurd vulgar error, gives to the bird the new name of night-*swallow*. [See Vol. IV. p. 424.]

> "In nova fert animus."
> "The mind is disposed for novelties."

I am, Sir, yours, &c.

Walton Hall, Dec. 21. 1831. CHARLES WATERTON.

ART. IV. *Remarks on the Nudity on the Forehead and at the Base of the Bill of the Rook* (*Córvus frugílegus* L.). By CHARLES WATERTON, Esq.

> ——— "Quæ causa indigna serenos
> Fœdavit vultus, aut cur hæc nuda patescunt?"
>
> "What has unworthily disfigured your sedate countenance,
> or why do these naked spots appear?"

I HAVE more than once nearly made up my mind to sit me down, some dismal winter's evening, and put together a few remarks on the habits of the rook. His regular flight, in congregated numbers, over my house, in the morning to the west, and his return at eve to the east, without the intermission of one single day, from the autumnal to the vernal equinox, would be a novel anecdote in the page of his biography. To this might be added an explanation of the cause of his sudden descent from a vast altitude in the heavens, which takes place with such amazing rapidity that it creates a noise similar to that of a rushing wind [see p. 239.]. His mischief and his usefulness to mankind might be narrowly looked into, and placed in so clear a light, that nobody could afterwards have a doubt whether this bird ought to be protected as a friend to a cultivated country, or banished from it as a depredating enemy.

I remember, some fifteen years ago, when I was very anxious to divert a footpath which had become an intolerable nuisance, the farmers in the district said that I should freely have their good-will to do so, provided I would only destroy a large rookery in a neighbouring wood. On the other hand, the villagers deplored this proposed destruction, as it would deprive them of their annual supply of about two thousand young rooks. Now the gardener abominated them. He called them a devouring set; said that they spoiled all the tops of the trees; and that, for his part, he hoped they would all of them get their necks broken. I myself, for divers reasons, was extremely averse to sign their death-warrant. Were I not fearful of being rebuked by grave and solemn critics, I would here hazard a small quotation: —

"Mulciber in Trojam, pro Troja stabat Apollo;
Æqua Venus Teucris, Pallas iniqua fuit."

"Vulcan 'gainst Troy, for Troy Apollo stood;
Venus was friendly, Pallas was adverse."

However, at present, it is not my intention to write the life of the rook, or even to enquire incidentally into its vices or its virtues. I merely take up the pen to-day, to show that the nudity on the forehead of the rook, and at the base of both mandibles, cannot be caused by the bird's thrusting its bill into the ground.

Bewick is the only one in Professor Rennie's long and fanciful list of "rudimental naturalists," "literary naturalists," and "philosophic naturalists, and original observers," who gives us any thing satisfactory concerning this nudity. He, sensible naturalist, cuts the knot through at one stroke, by telling us that it is an "original peculiarity." Montagu says that it is acquired by the bird's "habit of thrusting its bill into the ground after worms and various insects." From the study of Professor Rennie, this error is renewed to the public, in the second edition of the *Ornithological Dictionary*. Let us look into this error.

Every observer of birds must know that when the young rook leaves its nest for good and all, there is no part of its head deficient in feathers. Before winter, this young bird loses the feathers on the forehead, under the bill, and at the base of both mandibles. The skin where these feathers grew puts on a white scurfy appearance. Now, if these feathers have been worn down to the stumps by means of the bird thrusting its bill into the ground, these stumps would fall out at the regular moulting time, and new feathers would soon make their appearance. If, again, these feathers have been loosened at their roots by the process of thrusting the bill into the ground (which I consider next to impossible), and in consequence of this have fallen out from their places, new feathers would be observed in a few weeks; for when once a feather is eradicated, nature instantly sets to work to repair the loss by another; nor do we know of any process that can be applied with success, to counteract this admirable provision of nature. Again, these new feathers being full of blood at the roots, any application tending to grind them down, or to eradicate them, would be so painful to the rook, that it would not be able to thrust its bill deep into the ground.

I request the reader to bear in mind, that these arguments are brought forward only under the accepted supposition of naturalists, that the feathers are removed by the process of the bird thrusting its bill into the ground. But he who examines the subject with attention will at once see that the process itself could not destroy the feathers on the head of the rook; because, if they were destroyed by this process, the carrion crow, the jackdaw, the jay, the magpie, and the starling would all exhibit a similar nudity on the forehead, and at the base of the bill; for they all thrust their bills into the ground proportionably as deep as the rooks do theirs, when in quest of worms and grubs. Moreover, if the feathers are eradicated by the act of thrusting the bill into the ground, they would be succeeded by new ones, during the time in which that act could not be put in execution; for example, during a very dry summer, or during a very hard winter; and at these periods, as no action on the part of the rook would operate to destroy the coming feathers, an evident change would soon be observed about the head of the bird. In 1814, the ground was so very hard frozen, and covered with snow for some months, that the rooks could not by any means have an opportunity of thrusting their bills into it. Still, during this protracted period of frost, I could not see a solitary instance of renewal of the feathers on the forehead, or at the base of the bill, in the many birds which I examined.

I deny that the rook does, in general, thrust his bill deep into the ground. Look at this bird in the pasture, through a good glass (this puts me in mind of the Professor's suggestion of a thermometer and a stop-watch, p. 102.), and you will see that he merely pulls up the tuft of grass with the point of his bill. When on arable land, he will be observed to thrust his bill comparatively deeper into the mould, to get at the corn, which having just put up its narrow greenish white leaf, the searcher is directed by it to the sprouted grain. But he cannot be at this work above a fortnight: the progress of vegetation then interferes to stop the petty plunderer.

The quao of South America, a bird of the order of Pies, has a still greater portion of the forehead bare; and it must have put on this uncouth and naked appearance in early youth, for, on inspecting the head, you will see that feathers have once been there.

I could never, by any chance, find this bird in the cultivated parts of the country. It inhabits the thick and gloomy forests, and feeds chiefly upon the fruits and seeds which grow upon the stately trees in those never-ending solitudes. In fine, I consider the accepted notion, that the rook loses the feathers of its forehead, and those at the base of each mandible, together with the bristles, by the act of thrusting its bill into the ground, as a pretty little bit of specious theory, fit for the closet; but which, in the field, "shows much amiss."

For my own part, I cannot account for the nudity in question. He who is clever enough to assign the true cause why the feathers and bristles fall off, will, no doubt, be able to tell us why there is a bare warty spot on each leg of the horse; and why some cows have horns, and some have none.* He will possibly show us how it came to happen that the woman mentioned by Dr. Charles Leigh had horns on her head; which horns she shed, and new ones came in their place. Perhaps he will account for the turkey's putting out a long tuft of hair, amid the surrounding feathers of the breast. Peradventure he may demonstrate to us why the bird camichi, of Guiana, has a long slender horn on its head, and two spurs in each wing, in lieu of having them on its legs. By the way, who knows but that some scientific closet-naturalist may account for these alar spurs of the camichi, through the medium of that very useful and important discovery, the quinary system. Thus, for example's sake, suppose these said spurs were once normal or typical on the legs; but, by some rather obscure process having become aberrant, they made an approach or passage to the wings; while the bird itself was progressing in the circle, or leading round, in order to inosculate with the posteriors of its antecedent. He who clearly comprehends the quinary system will readily understand this.

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* Why have pigs six or more small circular pits, about a quarter of an inch apart, and ranged in a longitudinal, not transverse, row, on the inner face of one fore leg? Occasionally, the inner face of each fore leg is marked with a row of these; and, rarely, the pits or punctures are more or less perfectly absent from both. They are, I believe, never observable on either of the hind legs. On the fore leg, or, as it may be, legs, they may be readily observed, just after death, when the butcher is depilating these parts. — *J. D.*

If I had time just now, I would call in question the propriety of the assertion that the rook "is furnished with a small pouch at the root of the tongue;" and I would finish by showing the reader that the author of the second edition of *Montagu* was dozing when he deprived the rook (*C*órvus) of the good old sensible epithet frugílegus, and put that of prædatòrius in its place. [See Vol. IV. p. 424.]

Walton Hall, Feb. 10. 1832. CHARLES WATERTON.

ART. V. *Entomological Notes on a Journey through several English Counties, and in Wales and Ireland, during July and August*, 1831. By A. H. DAVIS, F.L.S.

ON the 18th of July I left London, and proceeded, by way of Birmingham and Shrewsbury, to Capel Cerig, in North Wales, where I designed staying a day, and then ascending Snowdon. The weather, which had been unsettled for several days, became, as I proceeded, excessively cold and wet; and, on my arrival at Capel Cerig, the rain fell in torrents, and continued the whole evening, detaining me within doors The windows of the inn were constantly visited by many trichopterous insects, so that I was not without sport; and in this way I took a fine series of Phrygànea vària, and several species of Limnéphilus. The two succeeding days continued very wet, with much wind; during the intervals of the heavy showers I collected a little in a plantation, and on the mountain opposite the inn. Among other captures may be named, of Coleóptera, Cỳchrus rostràtus, *C*árabus glabràtus; pitchy varieties of *C*árabus catenulàtus, Malthìnus nigricóllis, Colymbètes affìnis; of Lepidóptera, Eupithècia nova species ?, Ypsólophus costéllus, Anchylópera retusàna; of Neuróptera, Pérla mìnor; of Trichóptera, Leptócerus azùreus and bifasciàtus, Phrygànea mìnor; of Hymenóptera, Nemàtus váripes; of Díptera, Sphegìna nìgra, Loxócera *i*chneumònea, and a beautiful species of Macrócera.

The afternoon of Friday proved fine; and I resolved on ascending Snowdon the next day. Accordingly, about 7 o'clock on the ensuing morning, accompanied by a guide, I started, the summit of the mountain being ten miles distant. There was every appearance of a fine day, in which I was not disappointed. The pretty moth Aplócera cæsiàta, much faded, frequently flew out from the stone walls which lined the road. I availed myself of such opportunities as presented themselves for collecting; my guide, who knew the locality, directed me to the spot for *C*árabus glabràtus, of which we took many. Higher up the ascent, and indeed almost to the summit, I took both the red and black-legged varieties of Helòbia Gyllenhàl*ii* in considerable abundance, and some few specimens of Helòbia Marshall*àna*. Patròbus rùfipes was very common; and I took one within 6 ft. of the extreme summit, i. e. 3500 ft. above the level of the sea. I should not have named this common beetle, but from its having been described as a littoral [coast] insect. I reached the highest peak of the mountain, called Ywyddra, about midday: and, while admiring the magnificent prospect which an almost unclouded sky afforded, I saw a Pónti*a* flit by; and, shortly after, a small Geómetra, either Harpályc*e* fulvàta or Acidàli*a*? bilineàta. I was rather too late for Chrysomèla cereàlis, which, together with Leístus montànus, were taken on this and neighbouring mountains in June. I descended on the Llanberris side of Snowdon, and proceeded, by way of Caernarvon and Bangor, to Holyhead, and on the ensuing morning reached Dublin.

On the 25th and 27th of July I availed myself of a little leisure, to collect on the sand hills at Port Marnoch, about eight miles from Dublin. Several of the *P*apiliónidæ were in abundance; among others, Argýnni*s* Aglài*a* and Hippárchi*a* Sémel*e* were very fine. I scarcely observed a single coleopterous insect, except Sérica brúnnea; both days were dull, with occasional gleams of sunshine. On the flowers of the ragwort (*S*enècio Jacobæ`*a*), and close to the sea, I took several species of the genus A′grotis, in excellent condition, viz. vallígera, trítici *L.* and hortòrum *Steph.*, which, I think, is a variety of the former, and lineolàta *Haw.* Among a dwarf *S*àlix, a small but beautiful Tórtrix, Lozotæ`nia cruciàna, was in the utmost profusion, but very difficult to secure. Many species of Bómbus were also alighting on the various flowers. Pompìlus nìgra, and Collètes succíncta were also frequent. These sand hills are fertile in good insects; and Mr. Tardy, the most active of the few entomologists in Dublin, informs me that the larvæ of Actèbia præ`cox, Miàna literòsa, and Phragmatòbia fuliginòsa are abundant. On the same spot I also took Chrysòpa víridis *Dale's MSS.*, and Therèva annulàta.

On the 28th of July I returned to England by way of Liverpool, and crossed the Mersey to the Cheshire coast, on the sand hills of which I took Cicindèla hýbrida *L.*, the ripària and aprìca *Steph.* They flew well in the sunshine, and were very abundant. The low herbage was crowded with the various genera of Orthóptera, amongst which were some beautiful species of the genus Gomphócerus. The ragwort (*Senècio* Jacobæ`*a*) was equally abundant as on the opposite side of the Channel; but I did not observe a single specimen of A´grotis. The delicate little moth, Phibalápteryx lineolàta, was in fine condition, and I captured a good series.

Liverpool, although its neighbourhood affords great facilities for collecting, has no entomologists; and the collection at the Museum is very indifferent. Thence I proceeded to Manchester, in which spirited town the study of natural history in every branch has many enthusiastic followers. The late Edward Hobson, though moving in an inferior station, contributed greatly by his ardour and talent towards the extension of botanical and entomological knowledge. The collection of the Natural History Society is rather extensive; and there are several very valuable private collections, both of exotic and British insects, in the town and neighbourhood.

Many rare insects have been captured near Manchester, and I had myself the pleasure of securing, on the banks of the Irwell, Epàphius secàlis, Blèmus díscus, Péryphus ústus, &c. From various sources I also obtained specimens of Blèmus mìcros, Sapérda scalàris, and Bembídium paludòsum. I reached Halifax on the 2d of August, where there are several active collectors. It is well known to most entomologists that some of our latest novelties have been discovered on the moors and in the streams of this district, such as Leiochìton árctica and Reád*ii*, Tàrus basàlis, Helòbia Æ`thiops, Enicócerus víridi-æ`neus and Gibsòn*ii*. In addition may now be enumerated a species of Agònum new to this country.[*] Here

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[*] As this beautiful insect is undescribed, I will avail myself of a note to present it to your numerous readers:—

Agònum fúlgens *Davis's MSS.*; length 3 to 3½ lines. Nearly allied to A. austriacum. Of a brilliant fiery copper, mingled with a purplish tint; the sides of the thorax and the elytra reflecting a golden green, and the suture on each side occasionally tinged with a grassy green. Head rugose; anteriorly, with a transverse impression; posteriorly, smooth. Labrum, mandibles, palpi, and three basal joints of the antennæ, shining black, reflecting green. Thorax anteriorly with a curved impression extending to the angles; the sides considerably dilated, rugose, and elevated towards the posterior angles, an abbreviated dorsal channel; the base rugosely punctate, and the whole disk beautifully strigose. Elytra ovate, a little also I obtained several valuable insects, Lỳda cingulàta, Selándria dorsàlis, Peltástes dentàtus in Hymenóptera; and of Lepidóptera, Xylìna combústa, Rusìn*a* ferrugínea, Orthòsi*a* grácilis and púsilla, Eléctr*a* populàta, Adèla viridélla, and Cheimatóphila castànea. Several spirited individuals have lately established a museum at this place, and have lent their own collections as a commencement.

At Leeds there is a good public collection at the Museum, and one or two private ones. O´smylus maculàtus is taken at Kirkstall Abbey; and I am indebted for a fine series to Mr. Denny, author of an admirable monograph on the Pseláphidæ and Scydmæ´nidæ.

York has several active collectors, from whom I procured some valuable species taken during the preceding season, Agònum sexpunctàtum, Timándr*a* vespertària, Hippárchus *pa*pilionàrius, Macària lituràta, and Sìrex juvéncus; the males of this last insect are most commonly taken on the Minster, and an acute observer there informed me, that it was his opinion they merely made it a resting-point in their flight from a distance, as he has frequently seen them alight on the roof apparently exhausted, and shortly afterwards depart in an opposite direction.

At Nottingham, Anthóphora Haworth*àna*, of which the male had been previously recognised, has been discovered, and both sexes obtained. *S*apérda férrea, Serrócerus striàtus, and Onthóphilus sulcàtus have also been taken; and I was successful in procuring specimens of all but the last-mentioned.

Before I close these brief notes, I may state that I captured numerous rare insects in the neighbourhood of Blackheath, Kent, during June, July, and August, among which may be enumerated; in Coleóptera, Donàcia fúsca, Páchyta læ`vis, Hóplia argéntea, Magdàlis asphaltìna, Ophònus puncticóllis and foraminulòsus, Tíllus elongàtus; in Hymenóptera, *P*sén equéstris ♂ and ♀, Sarópoda furcàta, subglobòsa, and *v*úlpina, Panúrgus *u*rsìnus, Selándria ovàta, Dosýtheus abìetis; and in Lepidóptera, Ægèri*a* mutillæfórmis, Semàsia Wœber*àna*, &c., besides numerous other insects of moderate rarity.

I am, Sir, yours, &c. A. H. Davis.

London Dec. 5. 1831.

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depressed, delicately punctate-striate, and the interstices minutely strigose. Between the second and third striæ are five impressed dots; and in some specimens, another nearly at the termination of the seventh stria, and an irregular series of impressions on the margin: deeper towards the apex, and of a triangular form. Beneath, shining dark green, with a brassy tinge; femora and tibiæ shining black, reflecting a rosy tint; tarsi totally black.

Observations. The elytra, in some cases, suffused so as to resemble tarnished copper. — *Habitat.* The high moors near Halifax, during the winter; discovered by Mr. Booth, but exceedingly rare.

ART. VI. *Captures of Insects during Part of* 1830 *and Part of* 1831. By J. C. DALE, Esq. A.M. F.L.S. F.C.P.S. and Z.C.

(*Continued from* Vol. IV. p. 267.)

Sir,

I SEND you a list of my captures, in continuation of those published in Vol. IV. p. 265. To those there recorded I also supply some corrections and amendments. All my insects are named according to Mr. Curtis's *Guide to an Arrangement of British Insects.*

I am, Sir, yours, &c.

J. C. DALE.

Errata and Emendations. — Page 265. line 33. For "Cornwall," read "Somerset." l. 36. for "Milèsia, n. s." read "Spilomỳia femoràta?" *Curtis's Guide*, 1231, 1. l. 37. for "*B*látta Panzèri," read "*B*látta lappónica," *C. G.* 445, 6. l. 40. insert "June 17th" before "Fùmea nitidélla," *C. G.* 827, 6. l. 41. for Pteróphorus tridáctylus," read "ochrodáctylus," *C. G.* 1040, 13. l. 42. for "Pyraústa angulàlis," read "cingulàlis," *C. G.* 972, 2. l. 53. after "Hemeròbius" add "fuscus?" *C. G.* 741, 3. l. 50. after "Cleò*ra* cinctòria ♂," add "♀," *C. G.* 891, 12. l. 53. for "*C*ùlex concinnus," read "5-cinctus," *C. G.* 1137, 17. — Page 266. line 11. for "*E*`mpis pénnipes," read "vitripénnis," *C. G.* 1207, 12. l. 21. for "Liasa sea," read "on blue lias near the sea." l. 23. for "Geom. ambatàta," read "rubidàta," *C. G.* 930, 3. l. 25. for "tolerable plumage," read "plenty." l. 28. for "piniària," read "prunària," *C. G.* 897, 1. l. 29. after "*B*ombýlius" add "minor," *C. G.* 1194, 5. l. 29. for "*C*ístus perfòlius," read "Heliánthemum *p*olifòlium (in plenty)." l. 32. after "Helóphilus" add "æ̀neus (variegated eyes)," *C. G.* 1246, 2. l. 36. for "Islington," read "Ilsington." l. 38. after "Medéterus" add "bálticus," *C. G.* 1256, 9. l. 39. after "Bee" add "Hylæ̀us annulàris," *C. G.* 698, 2. l. 40. The rare rush on Appledore sand hills grows high, and the points sharp and dangerous. l. 44. after "Pteróphorus" add "similidáctylus," *C. G.* 1040, 17. l. 45. after "Tórtrix" add "Cnephàsia littoràlis," *C. G.* 959, 11. l. 46. for "barbatélla?" read "Lepidócera littoràlis?" *C. G.* 1034? l. 51. "*M*úsca pyrástri *bred*, larva found at Appledore," *C. G.* 1240, 7. l. 57. "The *T*ipula is Limnòbia xanthóptera," *C. G.* 1157, 25. — Page 267. line 2. "The Acánthia elegántula?" *C. G.* 1094, 8.

The *E*pipáctis palústris, p. 266. l. 20., was rather scarce, only two or three plants; but this year I found several in a moist copse at Glanvilles Wootton. The Campánula *h*ederàcea, p. 266. l. 35. (figured in Curtis's *Brit. Ent.*, pl. 257.), was scarce, in a swampy place near West Spitchweek Park. The *E*uphórb*ia* Paràlias (pl. 3.) was in plenty, and also at Dawlish Warren. This year I have raised, from the seed, *E*uphórb*ia* portlándica (pl. 322.), Heliánthemum *p*olifòlium, and Diánthus cæ̀sius, from Cheddar Cliff.

Captures continued.

1830. — Sept. 16th. Lewell: A'grotis crássa? — 23d. Glanvilles Wootton: Háliplus elevàtus, Hydróporus 12-pustulàtus, O`cys rùbens. — 28th. Portland: Aphòdius *p*órcus, A'crida grisea in plenty; Halíctus ♀ xánthopus? A`phis? Tephritis marginàta. — 29th. Lyndhurst in New Forest: *B*látta perspicillàris? ♀ on holly; Peronèa Desfontain*iàna*, whitethorns; P. litteràna and squamàna, Gracillària hemidactylélla, Pteróphorus calodáctylus, I'ssus coleoptràtus, holly. — 30th. Near Brockenhurst: Colymbètes ágilis, E'later sanguíneus, *G*érris apicàlis, *L*ocústa rubicúnda and lineàta ?

Oct. 1st. Near Lyndhurst: *A*chèta sylvéstris, in plenty; Gomphócerus rùfus, Ochthèra Mántis, on rushes in pools of water in gravel pits. — 2d. At Barton Cliff, saw Bórborus hírtipes ? — 4th. Mudeford Beach: ♂ and ♀ Redùvius subápterus, Heleomỳzæ sp. ? At Hurne Beach, Christchurch: Gomphócerus biguttàtus ? Pompìlus sp. ? Proctótrupes campanulàta ♂ and ♀, Simaèthis Myller*àna*, on a species of mint; Nemoúra pilicórnis, Pentátoma bìdens, Coríxa fossàrum and lacústris ? — 5th. Near Wareham, Dorset: Saw Còlia*s* Edùs*a*. — 6th. Maiden Castle, near Dorchester: Adimònia nigricórnis, Micrópeplus *p*orcàtus and *s*taphylinöìdes, Ceutorhýnchus hórridus, Thylacìtes geminàtus, *L*ocústa sp. ? green, with very short under-wings; Timárcha coriària, Pónti*a* nàpi ♀, large. Near Dorchester, by the river: Tánypus monìlis. — 13th. At Glanvilles Wootton: Coríxa affìnis, stagnàlis and n. s. ? — 15th. At West Camel, Somerset: Nóterus spársus.—17th. Vanéss*a* Atalánt*a*, bred (pupised Sept. 20th). — 19th. Eléctr*a* testàta, n. g. dilutàta and Pónti*a* nàpi. — 20th. Gracillària rufipenélla. — 22d. Near Glanvilles Wootton: Colymbètes pulveròsus, oblóngus, and Stúrm*ii*, Hýgrotus reticulátus ? Hydróporus dorsàlis and ovàlis, Nóterus spársus, Naúcoris *c*imicöìdes, in plenty; *D*ýticus punctulàtus ♂ and ♀, Coríxa lateràlis, &c. — 23d. Hydróporus lineàtus and rùfifrons ? — 31st. N. G. Phryganélla and Pónti*a* nàpi.

Nov. 7th. Misèlia aprilìna and Hybérnia brumàta. — 17th. N. G. dilatàta and Hybérnia brumàta.

Dec. 7th. Two or three Tórtrices and *T*ìneæ, much worn.

1831. March 17th. Weston on the Green, near Oxford: Saw specimens which had just been taken here of Nýssia hispidària and Lobóphora polycómmata. — 21st. At Weston: Helóphorus fénnicus, under stones. — 28th. Glanvilles Wootton: Orthòsi*a* pusílla and G. badiàta.

April 4th. At Glanvilles Wootton: Andrèna nítida ♂ and ♀ and Clerk*élla*, Pteróphorus tesseradáctylus. — 14th. Pónti*a* cardámines, Geom. suffumàta. — 15th. Yponomeùta lutària ? — 17th. Hadèna lithorhỳza, G. dilatàta. — 18th. G. fluctuàta, Epigráphia Steinhelner*àna*, Œcóphora sulphurélla. — 28th. Bred, Pónti*a* ràpæ.

May 1st. Lamprònia rubrifasciélla. — 7th. Lamprònia auropurpurélla and subpurpurélla, *B*íbio n. s. ♂ and ♀, in plenty; Pipúnculus sp. ? small. — 10th. Geom. suberària. — 11th. *B*íbio venòsus ♀ and vernàlis ? Pipúnculus sp. ? larger than the other; Oomórphus cóncolor *Curtis's Brit. Ent.*, pl. 347. ? ♀ A'bia serícea, Tórtrix Daldorf*àna* and maculosàna. — 13th. *B*ómbyx menthrástri, bred; M. Euphrósyn*e*, Hespèria málvæ ? and tàges, Libéllula 4-maculàta, Hylótoma ♂ ustulàta, the antennæ much thinner; Bánchus píctus ? Bòtys purpuràlis. — 17th. At Christchurch, Hants: Several Phrygàneæ, Potomària fúsco-cùprea, &c.; Sìlo pállipes ? Leptócerus autumnàlis, Goèra subnùbila, &c. — 19th. Near Lyndhurst, New Forest: *B*upréstis nitídula n. s., E'later ustulàtus and 2-pustulàtus, Callídium mýsticum and Leptùra præústa, pupa of Pìeri*s* cratæ'gi, and larva of *B*ómbyx cratæ'gi, Geómetra orbiculària and Bòtys terminàlis ? — 20th. Œdémera sanguinicóllis (*Curtis's Brit. Ent.*, pl. 390.) and viridíssima, E'later præústus ? and sanguíneus, Leptùra sex-guttàta, O'smylus maculàtus, Hemeròbius fúscus ? Ctenóphora flaveolàta and Milèsia speciòsa, Xylóphagus scutellàris ? ♀, Cleòr*a* cinctària ♂ and ♀, much worn. — 21st. Melitæ'*a* A'rtemi*s* and Hameàris Lucìn*a*, Peltástes (Mr. Rudd), with blue-black wings ♀ *T. R.*; A'radus depréssus, by Mr. Rudd. — 23d. *I'*ps 4-guttàta and 4-punctàta ? Raphídia and larva, by Mr. Matthews; A'radus corticàlis, A'nax imperàtor. — 25th. Melándrya *c*araböìdes, Mycetócharis scapulàris, Callídium testàceum, Páchyta collàris, by Mr. Matthews; Malthìnus, all black; Criorhìna floccòsa (Mr. Rudd took *T*ìnea Steinkèllneri and tessellàta? — 26th. Simaèthis punctòsa? G. lineària, Leptùra scutellàta, by Mr. Matthews, and Spilomyia cimòsa by Mr. Rudd. — 27th. Ctenóphora nigricórnis and sp.? Melándrya canaliculàta, by Mr. Matthews; *C*icàda ánglica, by Mr. Matthews; Mícrodon *a*pifórmis. — 28th. *C*icàda ánglica; larvæ of *B*ómbyx monàcha; larvæ of *N*. spónsa, promíssa, &c. — 30th. Lithòsia rubricóllis, Geómetra chærophyllàta, E'mpis pénnipes ♀, Scaphídium 4-maculàtum, Leptùra nìgra, læ`vis, and abdominàlis; Dásytes nìgra? ♂ and ♀; Thýmalus limbàtus, Tórtrix arenària, and permixtàna, Criorhìna berbérine, by Mr. Curtis. — 31st. Malàchius bituberculàtus.

June 1st. Near Decoy Pond: Phrygànea Dàle*i*, *Curtis's MSS.*; Donàcia fúsca, Córixa n.s.? Ctenóphora pectinicórnis ♀, Melitæ`*a* Selèn*e*, A`phis quércus? Bùpalu*s* favillaceàrius, Phytómetra æ`nea, Donàcia tỳphæ, &c.; Plátynus angusticóllis, &c. — 2d. Argýnni*s*, larva pupised; Pìeri*s* cratæ`gi, H. Lucìn*a*, Cordùlia æ`nea, Bupréstis nitídula, Cryptocéphalus bipustulàtus, Làmia núbila, taken; Loxócera hantoniénsis *Dale's MSS.*; Ctenóphora nigricórnis, Xylóphagus compéditus? by Mr. Curtis. — 4th. Ulciòta flàvipes, Mélasis buprestöìdes, Lýctus fúscus and Bítoma crenàta. — 8th. Ramsdown, Hants: *C*icindèla sylvática, Cordùlia compréssa, by Mr. Curtis. — 9th. Bourne Mouth, Hants: Tephrìtis syngenèsiæ, *C*icindèla marítima, by Mr. Curtis. — 10th. Wareham Harbour, Dorset: *C*árabus nìtens, E'laphrus uliginòsus, and Gyrìnus villòsus by Mr. Curtis; Ochthèbius marítimus, Acánthia zostèra, marginàlis, &c.; Dolíchopus pénnipes, Xylòta bifasciàta, Donàcia fasciàta, símplex, &c. — 13th. Glanvilles Wootton: *C*urcùlio abìetis. — 14th. Polyómmatus A`ci*s*. — 20th. Rhàphium, white; Oxýcera anàlis, Pachygáster Leách*ii*, Thróscus *d*ermestöìdes, Phrygànea dorsetténsis. — 21st. Anòbium *p*tinöìdes, on alder; Làphria nìgra, Middlemarsh Wood; Mícrodon *a*pifórmis, Mr. Curtis; Geómetra syringària, prunària, and fléxula. — 22d. *T*abànus vittàtus ♂ and ♀. — 24th. Portland: Hárpalus melámpus, and thoràcicus and vernàlis; Otiorhýnchus rùgifrons? Mazòreus by Mr. Curtis; and a pug, Acidàlia degenerària *Curt. Br.Ent.*, pl. 384.; *C*árabus n.s.? Proctótrupes campanulàtor, Ocýptera brassicària by Mr. Curtis; Phycìta cryptélla? and another; Andrèna sp.? n.g. strigòsa, Còlia*s* Edùs*a*, Hippárchi*a* Galathæ`*a*, Œdémera lùrida, Macroglóssa stellatàrum. — 26th. Bred, Argýnni*s* Pàphi*a*. — 27th. Bred, *B*ómbyx zíczac. — 28th. *S*árgus nítidus, Tórtrix hastiàna, Peronèa sp.? — 29th. Thècl*a* quércus, bred; Oxýcera pulchélla.

July 1st. ♂ and ♀ Bómbus Burrell*ànus*, Chérmes? striped body; Oxýcera formòsa. — 2d. Clòeon bioculàta? Gracillària (△ mark) sp.?, Cryptocéphalus pusíllus var. N. B. They never vary in Portland, but they do *here*. A plant, *E*pipáctis palústris. — 3d. *B*ómbyx monàcha bred (the last ditto, bred Aug. 3d.). — 4th. *P*apílio Machào*n* bred; larva of *B*ómbyx córyli, bred 28th; *C*ìmex albo-marginàta. — 6th. Phytómetra lusòria, *B*ómbyx domínula. — 9th. Saw A`nax imperàtor in our pond!!! saw *T*ìnea punctaurélla? Geómetra thymiària and *T*ínea sequélla? — 10th. Geómetra volutària and procellàta, N. trapetzìna bred. — 11th. Portland: Bánchus monilineàtus ♂ and ♀, *I*chneùmon, allied to Bánchus; *N*óctua conígera, Cleodòbia angustàlis ♀, Phycìta cárnea and sanguínea, n. g. silacélla, Tephrìtis pállida, on thistles. — 12th. Portland: Ocýptera brassicària, Pteróphorus lunædáctylus ♀, Hippárchi*a* Galathæ`*a*, Tórtrix Zœgàn*a* and Orthotæ`nia n. s. — 13th. Isthmus of Portland: Hárpalus n.s.? allied to stýgius, but much larger and flatter; Cistèla sulphùrea, Therèva sp.? Helóphilus æ`neus ♀. — 14th. At Charmouth: Cicindèla and Panórpa germànica, *T*ínea cinctélla and Damóphila trifòlii *Curtis's Brit. Ent.*, pl. 391.; Pteróphorus similidáctylus, *A*siràca pulchélla and Platycéphala umbraculàta, and *O*'rtalis omíssa. — 15th. Pinny Devon, near Lyme Regis, Dorset: Eudòrea linèola, Phycìta sanguínea, *T*ínea præangústa, Pachygáster 2 sorts, Oxýcera *p*ardalìna?? and 2 n.s. — 21st. Appledore, Devon:

Oxýbelus uniglùmis (insects remarkably scarce there). — 22d. Near Oakhampton, Dartmoor, &c.: Argýnni*s* Pàphi*a*, in great plenty. — 26th. At Torquay: Cistèla sulphùrea, in plenty; Ophònus angustàtus, Lycæ̀na Argìolu*s*, seen; Medéterus n. s.? on rocks nearly covered at high water. — 27th. At Dawlish: *M*úsca meridiàna. — 28th. At Glanvilles Wootton: *N*óctua prómissa, bred. — 29th. At Glanvilles Wootton: *N*óctua spónsa, bred; and *B*. córyli.

Aug. 11th. Acílius, in our pond; the first I have taken for thirteen or fourteen years; *N*óctua punícea. — 14th. At B. Caundle: Saw L. Argìolu*s*. — 16th. Lophýrus rùfus ♀, bred; they all pupised on the 2d of June, and they continued to breed till the 16th of September. — 17th. Vanéss*a* cárdui, Tórtrix populàna. — 31st. Cássida ánglica.

Sept. 2d. Vanéss*a* Atalánt*a*; saw two of Còlia*s* Edùs*a*. — 6th. Two larvæ in a case (Penthóphera?). At Stafford, Dorset: Saw some Mymars (Bómbus Burrell*ànus*). — 8th. At Dorchester: Hemerodròmia monostígma. — 12th. Cássida ánglica and Chrysomèla quinquéjugis, Galerùca vibúrni, Phrygànea echinàta, Simaèthis lutòsa, Tórtrix trapetzàna, *C*urcùlio sp.? Dròmius 4-guttàtus, *B*ómbyx cæruleocéphalus, bred. — 16th. Bred, *N*óctua lámbda. — 17th. Plutélla asperélla and dentélla? Peronèa striàna, *T*ínea sp.? — 19th. *S*árgus flavipes, Coríxa dorsàlis? — 23d. Acheróntia A′tropo*s*, brought here by Mrs. Williams's gardener. — 25th. The Penthóphera larva appears to be spun up. — 30th. *I*chneùmon, bred from *B*. cæruleocéphalus; larva of Geómetra lichenària? spun up.

Oct. 12th. Geómetra pennària ♂ and ♀, bred.

Nov. 4th and 14th. Tórtrix caudàna, worn; *L*ampýris noctilùca ♀ brought by John Bolt. — 24th. *T*ínea like anastomòsis, in our window. — 30th. Saw Scatóphaga sp.?

Dec. 1st. Sarróthripus punc., window. — 2d. ♀ *B*ómbyx pópuli, bred.

ART. VII. *An Account of the parasitic* Músca *larvàrum preyed on by parasitic Pterómali, while both were in the Body of* Phalæ̀na *Bómbyx Càja*. By EDWARD NEWMAN, Esq.

Sir,

DURING last June, I collected a number of the pupæ of that splendid moth commonly known as the garden tiger (*P*halæ̀na *B*ómbyx Càja *Linn.*); my object being to obtain varieties for my cabinet. I preserved them in damp moss, in a common breeding-cage covered with gauze, after the customary plan. On opening the cage-door one morning, three or four flies [*M*úscæ] made their escape; and, flying to the window, soon became so mingled with other flies (previously there), that securing them would have been useless, as I had no means of ascertaining their identity. I concluded they were parasites; and on examining the pupæ of *P*. *B*ómbyx Càja, found two of them perforated, from which the flies had evidently made their escape. This circumstance was too ordinary to attract notice; but a few mornings after, I found the whole of the gauze in the interior of the cage covered with minute hymenopterous insects, which were running and jumping about in all directions, but were collected in the greatest number on that side of the cage nearest to the light. Not having leisure to attend at the moment to the securing, killing, and setting them, I closed the door of the cage, and left the house for some hours: judge of my astonishment and mortification, on returning, at not being able to discover a single individual. I shook out the whole of the moss, fragment by fragment, but in vain, nor have I since been able to guess what became of them. I however observed that many of the pupæ had very small and perfectly circular holes, through which the little hymenopterous insects must have made their egress; the holes made in the pupæ by the flies being much larger, and jagged at the edges. The following morning I was gratified by finding a new, but much less abundant, supply of the Hymenóptera; I instantly secured some of them, and they appear to belong to the genus Pterómalus *Dal.* 627. *Curtis's Guide.* I now proceeded to open with the point of a penknife the remaining pupæ of the *Bómbyx*; the perforated ones contained nothing but the exuviæ or pupa cases of the Pterómali; but among the others, which were hard and stiff, and apparently dead, I found one quite filled with the coarctate pupæ of a *Músca.* On applying the point of my knife to these, I found some contained flies [*Múscæ*], which, thus prematurely liberated, never came to perfection; but by far the majority of these flies or *Múscæ* were filled with Pterómali in the various stages of larva, pupa, and imago. The *Múscæ*, although imperfect, I ascertained on comparison to be the *Músca* larvàrum of Linné; a specific name, however, to which I suspect more than one true species is referable.

Here then was a parasite on a parasite, the *Músca* being evidently the original parasite of the *Bómbyx*, and the Pterómalus as evidently parasitical on the *Músca.* A very interesting question arises from this discovery. How could the parent Pterómalus introduce its eggs into the larva of the *Músca*; that larva being completely immersed in the interior of one of our most hairy caterpillars, a situation apparently so secure? I fear we shall long want a practical solution of the problem; in the mean time, we must content ourselves with a theoretical one.

It is well known to all those who have paid much attention to the rearing of lepidopterous insects from the larva, that they are subject to two distinct tribes of parasites, *I*chneùmones and *Múscæ.* The females of the *I*chneùmones are furnished with a long sharply pointed oviduct, for the express purpose of piercing the skin of the destined victim of their larvæ, and of depositing their eggs beneath the surface: the females of the *Múscæ*, on the contrary, have no such apparatus, but merely place their egg on the surface of the skin, to which it adheres by means of a glutinous matter exuded with it. I must here, however, mention that the learned authors of the *Introduction to Entomology* have (vol. i. p. 345.) the following sentence: — "Some ichneumons, instead of burying their eggs in the body of the larvæ that are to serve their young for food, content themselves with glueing them to the skin of their prey, which the young grubs pierce as soon as hatched." Now, I by no means imagine that such a sentence would have found its way into so correct a work without the best authority; yet, as in no instance in which I have found the egg thus attached has the larva produced any other than a dipterous parasite, I think we may fairly conclude that piercing and glueing are the general and distinctive rule or habit of each particular tribe; and the fact asserted by Messrs. Kirby and Spence an exception to the rule.

The egg of the *Músca*, which, I may remark, I have always observed to be placed on the neck of the larva, the only part from which the annoyed insect could not remove it, is very conspicuous to an observer; and experienced collectors of Lepidóptera, when they find the larva of a rare species with this egg attached, make a practice of removing it, and the larva will then thrive and come to perfection. With the egg in this situation, thus easily visible to the human eye, we cannot wonder that the active and instinct-guided Pterómalus should discover it; nor does it appear an improbable supposition that the little creature seizes this opportunity of piercing the shell with her oviduct, and depositing her egg amidst its contents. So that the larva of the *Músca*, as soon as hatched, in burying itself in the fleshy larva of the *Bómbyx*, is compelled to carry with it a horde of insidious parasites, which, although they interfere not with the due performance of its appointed work of destruction, yet in the end so weaken it that it never arrives at perfection. Thus the *Bómbyx* and *Músca*, both excessively voracious tribes, perform the task allotted them by Providence; yet are by this minute creature prevented from reproducing their species, whose increase, unchecked, would speedily depopulate the earth. The question as to the difficulty which so small an insect would experience in piercing a substance so hard as the egg-shell of the *Músca*, may be at once answered by the fact that many species of the same tribe [Platygáster ovulòrum is one instance, see Vol. III. p. 452.] are known to be parasitical on the eggs of butterflies, in which they have been deposited by a similar operation. In the case of the pupæ of the *Bómbyx* Càja, which contained nothing but the exuviæ of Pterómali, it may be fairly concluded that the larvæ of these (the Pterómali) were too numerous, or became too powerful, to permit the larvæ of the *Músca* undergoing their usual metamorphosis: a circumstance much less to be wondered at, than that they should ever accomplish the change when in so debilitated a state.

I am, Sir, yours, &c.

Deptford, Nov. 26. 1831. EDWARD NEWMAN.

ART. VIII. *An Account of the Sandal Wood Tree* (Sántalum), *with Observations on some of the Botanical Productions of the Sandwich Islands.* By GEORGE BENNETT, F.L.S., Member of the Royal College of Surgeons in London, &c.

THE sandal wood tree (*Sántalum*) is placed in the natural order *Santalàceæ*, class Tetrándria, order Monogýnia. There are several species, but all have not wood possessed of fragrance. Of those from which the scented wood is procured I am acquainted with three species: two have been described, one the *Sántalum* myrtifòlium, found on the coast of Coromandel; and *S.* Freycinet*iànum*, found at the Sandwich Islands; the other, an undescribed species, at the New Hebrides group; the latter appearing to have an affinity to that found on the Coromandel shores.

The native names of the sandal wood, among some of the countries where it is found indigenous, are as follows: —

Among the Malays, Jeendana. New Hebrides: Island of Erromanga, Nassau; Island of Tanna, Nebissi; Island of Annatom, Narti niat. The Marquesa group, Bua ahi. The Island of Oparo, Turi turi. At the Island of Tahiti (where it has been found on the mountains, but is very scarce) and Eimeo, Ahi. On the Malabar coast, Chandana cotte. In the Island of Timor, Aikamenil. In the Island of Amboyna, Ayasru. At the Fidji group, Iarsé. At the Sandwich Islands, Iliahi.

This fragrant wood, valuable as an article of commerce to China, is found in India, Eastern Archipelago (more particularly in the islands to the eastward), the Marquesas, Fidji and New Hebrides groups, &c.; the Island of Juan Fernandez, and has been occasionally found on the high mountains of Tahiti, Eimeo, and Raivavae, or High Island. Mr. Crawford observes (*Indian Archipelago*, vol. i. p. 419, 420.), respecting sandal wood, that it is "a native of the Indian islands, and is found of three varieties, white, yellow, and red; the first two being most esteemed. From Java and Madura, eastward, it is scattered in small quantities throughout the different islands, improving in quantity and quality as we move to the east, until we reach Timor, where the best and largest supply occurs." And again he observes: — "In the western countries, where it either does not exist at all, or exists in small quantity and of bad quality; it is universally known by the Sanscrit name of Chandana, whence it may be fair to infer that its use was taught by the Hindûs when they propagated their religion, in the ceremonies of which it is frequently employed."

The sandal wood tree is most usually found growing on hilly rocky situations; and, when growing on low land, is usually found degenerated. This latter circumstance is known to the Chinese; for, at Singapore, a Chinese merchant observed that the sandal wood found growing on the rocky mountains contains the greatest quantity of oil, and is of more value than that found growing in low situations and rich soil, as the latter is found to have degenerated. On asking him whence he derived his information, he stated, "from Chinese books." At the Friendly Islands they use the wood for scenting their cocoa nut oil, and a piece of the wood is considered a valuable present by the chiefs; they procure it occasionally from the Fidji Islands, and call it hai-fidji. The tree will not thrive at Tongatabu. The species found at the Island of Erromanga (New Hebrides) has ovate, entire, smooth, petioled leaves, of a light green colour above, whitish and distinctly veined underneath; some of the leaves varied in being pointed. It is a tree of irregular and slow growth, attaining the height of about 8 ft. without, and 30 ft. with, branches, and about 2 ft. in diameter. I always remarked, however, that after attaining a moderate size it was invariably found rotten in the heart. Sandal wood is very heavy, sinks in water, and the part of the tree which contains the essential oil (according to Cartheuser, 1 lb. of the wood will yield 2 drachms of the oil) on which the agreeable odour depends, is the heart, the other portions of the tree being destitute of any fragrance. This portion is surrounded by a lighter wood of some thickness, denominated the sap, which is carefully removed from the heart wood. Sandal wood is sold by weight, and varies in price, according to the size and quality, from 3 to 20 dollars and upwards the picul (133 lbs.). When young, the wood has a whitish colour, and possesses but little fragrance; as it increases in age it becomes of a yellowish colour; and, when old, of a brownish red colour, and, at that period is most valued, from containing the greatest quantity of that essential oil on which its fragrance depends. It is considered the wood is never attacked by insects: this assertion is erroneous, as I have seen the nidus of some species formed in it.

At the Sandwich Islands, the tree is named iliahi or lauhala, signifying sweet wood (*lau*, wood, *hala*, sweet); and, when young, it is of very elegant growth. At Wouhala (Island of Oahu), I observed numbers of the young trees, some of which were covered by a profusion of beautiful flowers of a dark red colour; the flowers, however, are often observed to differ in colour on the same tree, and even on the same stalk; they grow in clusters, some having the corolla externally of a dark red colour, and internally of a dull yellow; others having it entirely of a dark red, and others again have the corolla partly red and white externally; the young leaves are of a dark red colour, and give an elegant appearance to the tree. This was not observed in the species found at the Island of Erromanga; indeed, the species found at the Sandwich Islands had a more handsome appearance in its growth than that at Erromanga. At the Sandwich Islands, two varieties of the wood are observed by the natives, depending, however, only on the age of the tree; the young or white wood is called lau, keo keo (*lau*, wood, *keo keo*, white); and the red wood, lau, hula hula (*lau*, wood, *hula hula*, red). As before stated, the wood, when taken from a young tree, is white, containing but a small quantity of oil; as the tree increases in growth, the wood becomes of a yellowish colour, and the oldest and best is of a brownish red colour.* The different varieties of the wood depend, therefore, on the age of the tree; and are of three kinds, white, yellow, and red; of which the yellow and red, from containing the largest quantity of oil, are most esteemed in the Chinese market, where the wood is principally used, the expressed oil being mixed with pastiles, and burned before their idols in the temples. The Chinese are said to procure the oil by rasping the wood, and then expressing it through strong canvass bags.

Indigenous to the Sandwich Islands is a speceis of Myópo-rum (M. tenuifòlium), the heart of which is fragrant; and, from having been mistaken for sandal wood, it has received the name of spurious sandal wood from Europeans, and is called naiho or naihio by the natives. The heart contains a quantity of essential oil; but the fragrance is not so agreeable as that derived from the sandal wood, and for that reason it is not esteemed in the Chinese market: the heart is also surrounded by a lighter wood, termed the sap, as in the sandal wood tree. An instance of the resemblance this bears to the sandal wood, so as to deceive a common observer, occurred during my visit to the Island of Oahu (Sandwich Islands), in December, 1829. Two large pieces of the naiho, deprived of the sap, were collected for me, and had been placed in the yard of a mercantile gentleman previously to my taking them on board. At this time there was some sandal wood, of small size, weighing in the yard, to be sent on board an American ship about to sail for Canton. The supercargo, who was superintending the weighing, seeing these pieces, mistook them for sandal wood; and, anxious to secure two such large pieces among the small kind which he had purchased, placed them in the scales; and they were sent on board with the rest, the person engaged in weighing being also ignorant of the difference. This circumstance was not discovered until some time after the ship had sailed: engaged in other pursuits, I had for some time forgotten my wood; but on enquiring for it, its disappearance was accounted for, after some time, by the cause just related. I was informed that a cargo of the wood was taken by an American ship to Canton; and, on its arrival there, it was only considered fit for fire-wood.

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* The wood is frequently buried, and the sap allowed to rot off: and this is considered to improve its quality.

The name of a "spurious sandal wood" is a source of alarm to those who, engaged in purchasing sandal wood, are not able to judge of the difference, or had only known the "spurious kind" by name. An instance of this occurred under my own observation. A vessel arrived from the New Hebrides group at the Bay of Islands (New Zealand) in July, 1829, having on board some sandal wood. This was purchased by the commander of a ship lying at that place; he had only heard of the existence of a spurious kind when at the Sandwich Islands, but, never having seen it, was unable to judge of the difference. When the sandal wood came on board, it was found to consist of the white, yellow, and red varieties, having been procured from trees of different ages; that which was of a whitish colour, and had less fragrance than the other wood, was considered immediately as what he had heard of as spurious wood, and was rejected, much to the annoyance of the owner, who declared it was all sandal wood. This supposed spurious kind was laid aside, and was finally delivered to the cook for fire-wood; and, when burning, a delightful fragrance was diffused over the ship. Some of it was landed amongst the fire-wood from the same ship at the Sandwich Islands, much to the surprise of some of the merchants, who thought that sandal wood must be very common on board when it was used as fire-wood.

The naiho (Myóporum tenuifòlium) attains the height of 15 to 20 ft., and a circumference of 3 or 4 ft.; the scented wood differs, according to the age of the tree, from a light yellow to a reddish colour; the tree is branchy; the leaves are lanceolate, entire, pointed, smooth, and of a light green colour; the flowers are small, solitary, of a white colour, with a pink spot on the internal part of each petal, the corolla five-cleft, stamina five, attached to the corolla. This tree is found growing on elevated situations, the wood is considered of excellent quality for planes, and is used by the carpenters at the Sandwich Islands for that purpose.

The vegetable productions are very numerous among the Sandwich group; among them I observed the *A*càcia falcàta, or koa of the natives, growing abundantly on the hills; the wood is very hard, is used in the manufacture of canoes, and was formerly tabued exclusively for that purpose. On this tree I observed a species of *V*iscum growing abundantly.

On the declivities of the hills, as also in the valleys, grow two species of Eugèn*ia*. One is called by the natives ohia reua (*reua* signifying a flower), the flowers of which were used for necklaces, and the tree was formerly held sacred: it attains a great elevation; is branchy, and small in circumference; and when covered with a profusion of its red blossoms has an elegant appearance. The other species is the ohia ha, the wood of which is used for building and other purposes, and the bark is used by the natives for dyeing their cloth of a dark brown or reddish colour. The Jambo (Eugèn*ia* malaccénsis) is also indigenous, and is named ohia ai (*ai* signifying to eat).

The native females use a variety of flowers in the formation of their leis, or head wreaths, of which those of yellow or orange colours are preferred; as of a species of *S*ìda, the rima of the natives, which is cultivated, and produces double flowers. A species of *T*ríbulus, called nohu by the natives, is very abundant on the plains, the leaves of which are pinnate, and covered, as well as the stalks, with a light silvery pubescence; the flowers are yellow, five-petaled, calyx five-cleft, stamina ten; the fruit is small, armed with five or six short spines, and contains several seeds; the natives dread them, and avoid walking on the plains with their bare feet during the season it is in fruit. A species of Argemòne abounds wild, bearing large beautiful white flowers (probably grandiflòra); it is indigenous to the Sandwich Islands, and was remarked by Captain Cook when he discovered the group. In the valleys the fern, called apu by the natives, was frequently seen; it is the Cibòtium Chamísso*i*; it is arboreous, with three pinnated fronds, and the stipes are covered by a fine silky down, of a yellowish brown colour, which is now used for stuffing pillows, &c. This down is called pulu apu by the natives (*pula* signifies anything soft). The fronds emerge direct from the tubers, and attain the height of 8 or 10 ft.; it grows abundantly in shady places and on the borders of rivulets, over which the long fronds droop; the leaflets are from 1 to 2 ft. in length. The Sadlèr*ia* cyatheöìdes *Kaulf.*, called mau by the natives, is also abundant in the valleys, and has an elegant appearance when the young fronds are emerging, which are then of a beautiful scarlet colour, changing, as the leaf attains maturity, to a dark green.

On the 10th of December, 1829, I visited the district of Wouhala (Island of Oahu); on ascending a high hill, the plains on the summit were found covered with dry grass, and various plants and shrubs, and at some parts deep wooded glens formed most picturesque and beautiful scenery. Among the specimens of plants, &c., I collected were the following: —

A species of Cyathòdes, called pokeawi by the natives, bearing small red berries; the same native name is given to red beads, from their resemblance to the berries of this shrub. A species of Phytolácca, called poporo-tumai by the natives; the berries (which grow erect in long bunches) yield a reddish brown juice, used for dyeing the native cloth; the berries externally are of a purplish red colour; the leaves of the shrub are cooked and eaten.

On the plains was found a species of Dian*élla*, named uki by the natives, bearing small berries of a mazarine blue, which are used by the natives in making a permanent blue dye. The *Pý*rus *a*nthyllidifòlia of Smith (in Rees's *Cyclopædia*), and more recently the Osteomèlis *a*nthyllidifòlia of Lindley (in the *Linnean Transactions*), called uré by the natives, was very abundant; it is a small shrub, bearing berries of a white colour, containing a reddish juice of sweet and astringent taste; the flowers are white and fragrant

The mamati or cloth plant, also named oreyna, the *U*rtìca argéntea; the bark is used in the manufacture of the native cloth, and also produces a flax which might form a useful article of commerce. A species of Scæ'vola, named nouputa by the natives, was also abundant on the hills, bearing yellow flowers.

A shrub, attaining the elevation of 9 or 10 ft., called karia or taria by the natives, was abundant, but the only specimens gathered had abortive flowers.

A small tree, called lumma by the natives, had the leaves when young of a beautiful red colour, and the foliage has a peculiar appearance, apparently from minute glands situated on the upper and under surfaces. There is also a shrub (probably a Báss*ia*), called ohava, the seeds of which yield a red dye, used by the natives to stain their cheeks and fingers. A species of Gnaphàlium, called poina by the natives, was also abundant.

Of the uwara, or sweet potatoes (Convólvulus *Batàtas* et var.), which are much cultivated at the Sandwich Islands, there are seventeen varieties.

On the declivities of the hills, and in the ravines, the tui tui, or candle nut tree (Aleurìtes tríloba) is seen abundant; the whiteness of its foliage rendering it a conspicuous object. This whiteness is occasioned by a fine white powder on the upper surface of the leaf, which is readily removed by the finger. Under it the leaf is found of a dark green colour. The young foliage is thickly covered with this white powder; the older leaves have little, or are entirely destitute of it. The foliage of this tree varies much in form, depending on the age of the tree or leaves. The flowers grow in erect clusters, are small, white, and possessed of very little fragrance; the fruit is of small size, globular, rough externally, and contains oily nuts, which, when baked and strung on a reed, are used by the natives of most of the Polynesian Islands as a substitute for candles or lamps, and burn with a clear and brilliant flame. The tree is branchy, attains an elevation of 30 ft. in height, and a circumference of 3 or 4 ft., the timber being of soft quality is useless, except as firewood. A gum is yielded by this tree, both spontaneously, and on incisions being made in the trunk. It is of a yellowish colour, inodorous and tasteless; the natives chew it, but the suspicious family [*Euphorbiàceæ*] to which the tree belongs would render caution requisite in its use. I tried it, however, as a mucilage for the suspension of some balsams, without any ill effects arising from it.

The turmeric plant (*Curcùma* lónga), called oreina by the natives, is abundant wild; the root, as well as that of the noni (Moríndа *c*itrifòlia), is used for dyeing their native cloth of a bright yellow colour. At Tauai or Atoi (which I visited on the 28th of January, 1830) I collected a delicate and beautiful species of Ipomœ̀a covered with a fine pubescence (Ipomœ̀a pubéscens ?); it is called mohihi by the natives; it grows in rocky soil, and bears white flowers. There is also a small species of Convólvulus, bearing small light blue flowers, and called koro koro by the natives.

London, Jan. 20. 1832.

ART. IX. *Volcanoes.* By W. M. HIGGINS, Esq. F.G.S., and J. W. DRAPER, Esq.

(*Continued from* p. 172.)

THE Phenomena which attend Eruption. — Volcanic eruptions are not periodical, as some persons have supposed; the period and intensity of their action are decidedly irregular. This is proved by the history of almost every volcano with which we are acquainted. Some general classification, however, may be formed, dependent on a certain similarity in the method and periods of eruption in different volcanoes: some are in a state of incessant moderate action; in some we find short intervals of repose alternating with lengthened periods of eruption; while others are characterised by lengthened quiescence and paroxysms of excessive violence. Here, then, we have three classes of volcanic action, which have been thus arranged by geologists: — 1. Phase of permanent eruption; 2. Phase of moderate activity; 3. Phase of prolonged intermittences.

Volcanoes of permanent Eruption are very few in number: we are not perfectly acquainted with more than three, that of Stromboli, one of the Lipari Isles; the Devil's Mouth, in the Lake of Nicaragua; and one in the Isle of Bourbon.

Stromboli has been in a state of constant activity for more than two thousand years, and is a good type of this class: lava seldom overflows its crater, but large masses of burning rocks and scoriæ are incessantly ejected in a perpendicular direction. This phenomenon, accompanied by a loud explosion, occurs every seven or eight minutes; of which fact we are informed by Pliny, as well as by modern travellers.

Dolomieu examined this interesting mountain, and has given us the following description of its eruptions: — "The inflamed crater is on the north-western part of the isle, on the side of the mountain. I saw it dart, during the night, at regular intervals of seven or eight minutes, ignited stones, which rose to the height of more than a hundred feet, forming rays a little divergent, but of which the greater quantity fell back into the crater, while others rolled even to the sea."

On the following day he ascended an eminence of the mountain, from which he obtained a still more interesting view of the volcano. "The crater," he says, "is very small; I do not think it exceeds fifty paces in diameter, having the form of a funnel terminating in a point. During all the time I observed it, the eruptions succeeded with the same regularity as during the preceding night. The approach of the eruption is not announced by any noise or dull murmur in the interior of the mountain; and it is always with surprise that one sees the stones darted into the air. There are times when the eruption is more precipitate and violent; and stones describing more divergent rays are thrown into the sea at a considerable distance."

It has been stated by Dolomieu, Hamilton, and Scrope, on the authority of the islanders, that during the winter seasons the eruptions are far more violent than in summer; and that from its appearance they can generally predict the changes in the atmosphere. Sometimes during the storms of winter the cone is split, and large currents of lava are discharged. (*fig.* 61.)

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Volcanoes are in the Phase of moderate Activity when they are in a state of frequent and prolonged, but inconsiderable, excitement. Under this class we may place the volcano of Popocatepetl in Mexico, which was found in this phase by the discoverers of the country. Such, also, was the condition of Vesuvius from the commencement of this century to the year 1822.

The Phase of prolonged Intermittences is characterised by lengthened periods of repose, and eruptions of the most violent description. It has been maintained by Baron Humboldt that lofty volcanoes are always in this condition. The volcanic mountains of the Andes, for instance Cotopaxi and other elevated craters, have not an eruption, generally speaking, more than once in a century. The Peak of Teneriffe, which was active in 1798, had not at that time been disturbed for ninety-two years. It must not, however, be supposed that the phase of prolonged intermittences is confined to elevated craters, for history gives abundant instances to the contrary.

The phenomena which accompany eruption are the same in the phase of moderate activity and of prolonged intermittences. But in the former they are much less violent; all the terrible effects of eruption being felt in the immediate neighbourhood, but none of its phenomena witnessed beyond the narrow sphere of its activity. On the other hand, when a volcano is in the phase of prolonged intermittences, the eruptions are of great violence, and extensive in their effects. The explosions of Cotopaxi are sometimes heard at a distance of 600 miles; and those of Jumbawa, a Molucca island, were heard 900 miles off during the eruption in April, 1815.

The eruption of a volcano generally commences with a tremendous explosion, which is succeeded by others less loud, and the escape of aeriform fluids. Large fragments of rock and masses of lava are projected by these discharges, some of which fall into the crater to be again discharged; until they are so reduced as to be mingled with the surrounding atmosphere of heated vapour. The atomic particles produce the appearance of dense clouds of smoke, which are almost invariably seen to surround the summit of the crater.

The lava then rises to the vent of the mountain; and soon finds egress, whether it be from the crater or a lateral opening. In some cases, however, scoriæ alone are projected, or even mud. During the day, the lava is generally hidden by the aqueous vapours that arise from it, and, when observed, does not present the appearance of a heated mass; but during the night it appears of a glowing heat. While the lava continues to flow, the detonations are frequently less violent; but it is not until it is entirely stayed that there is any proof of the diminution of the paroxysm: and even the cessation of the lava does not indicate an immediate restoration of peace; for the ejection of scoriæ and masses of rock often recommences after the eruption of lava, and continues for some time after the dreadful crisis is past.

When the detonations become less frequent, rumbling sounds are heard, as of the retreat of many waters; and the mountain seems gradually to yield to exhaustion, or sinks into a state of partial rest, occasionally disturbed by explosions, the ejection of scoriæ and small masses of rock.

Towards the conclusion of an eruption, or after the lava has ceased to flow, the surrounding country is frequently enveloped in dark clouds of black-coloured sand, which, at the very close of the convulsion, is changed into a white comminuted pumice.

The lofty mountains seldom eject lava from their summits, but from lateral openings; for it requires far less power to open a passage in the side of the mountain than to elevate the intumescent mass to the summit. In the last eruption of Teneriffe, a lateral opening was formed; and, according to a calculation by M. Daubuisson, it would have required a force equivalent to a thousand atmospheres to have raised the mass of lava to its elevated crater.

Of volcanoes in the phase of moderate activity, the best example to which we can refer is that of Etna, between the years 1804 and 1818. Segnio Maria Gemmellario (*Jour. Science*, vol. xiv. p. 322.) has given us a very interesting view of the successive changes which were observed, through a meteorological journal kept at Catania.

On the 9th of February, 1804, there was a sensible earthquake: Etna smoked 97 days, but there was no eruption nor any thunder.

On the 3d of July, 1805, there was an earthquake: Etna smoked 47 days, and emitted flame 28 days. There was an eruption in June, but no thunder.

There were earthquakes on the 27th of May, and 10th of October, 1806. The mountain smoked 47 days, flamed 7, and detonated 28: little thunder.

On the 24th of February, and 25th of November, 1807, there was an earthquake. Etna smoked 59 days. Little thunder.

In August, September, and December, 1808, earthquakes were frequent. Etna smoked 12 days, flamed 102, and often detonated. Thunder storms were frequent.

From January to May, and during September and December, 1809, there were 37 earthquakes. The most sensible shock was on the 27th of March, when the mountain ejected lava on the western side. This eruption lasted 13 days; and part of the Bosco de Castiglione was injured. The mountain smoked 152 days, flamed 3, and detonated 11. Little thunder.

On the 16th and 17th of February, 1810, there were four earthquakes. On the 27th of October, Etna suffered an eruption on the east side, and the lava flowed into the Valley del Bue. There were about 20 thunder storms.

1818, no earthquakes. The mountain continued to eject lava from the east until the 24th of April. At this time the mount S. Simon was formed. No thunder.

3d and 13th of March, 1813, earthquake. The mountain smoked 28 days. On the 30th of June and 5th of August, S. Simon smoked. There were 21 thunder storms.

On the 3d of November, 1814, there was an earthquake, preceded by a discharge of sand from that part of the mountain called Zoccolaro. There were 12 thunder storms.

6th of September 1815, there was an earthquake. The mountain smoked forty-two days, and there were eleven thunder storms. On the 6th, 7th, and 11th of January the effects of the lightning were tremendous.

1816, no earthquakes. On the 13th of August there was a great noise, from the fall of part of the interior side of the crater. Ten thunder storms.

18th of October 1817, an earthquake. The mountain smoked twenty-two days. There were eight thunder storms.

During 1818 we had twenty-five earthquakes. The most violent was in the neighbourhood of Catania, on the 20th of February. The mountain smoked twenty-four days. No thunder.

Such are the phenomena which characterise an aerial volcano in the phase of moderate activity. The details themselves will have little interest to the general reader; but no description would give so adequate a conception of its ever-changing phenomena. In the minds of those who are unaccustomed to witness volcanic disturbances, these effects of volcanic causes in moderate activity would make an indelible impression; but those who had ever witnessed an eruption from an elevated volcano, after a period of long quiescence, would scarcely stay to regard these comparatively puny efforts. We now pass on to detail a few examples of activity in the phase of prolonged intermittences. The difficulty now is, not to find a characteristic type, but to choose from the variety of authenticated and interesting details we find in the page of history.

Vesuvius was in this phase previously to the violent eruption of 1794. A brief notice of the phenomena which attended this period of activity may give some notion of the violence of volcanic agency after a lengthened period of repose.

The first proof of the approach of this dreadful eruption was during the night of the 12th of June, when a severe shock of earthquake was felt in Naples and the surrounding country. Nothing more occurred to rouse the fears of the inhabitants till the evening of the 15th, when the earth was again violently agitated. Shortly after this an opening was formed in the western base of the mountain cone, which, on after examination, was found to be 2375 ft. in length, and 237 ft. in breadth, and a stream of lava was ejected. Not long after the volcanic action had commenced, four distinct hills were formed, composed of lava, from each of which stones and other ignited substances were thrown in such quick succession, that it appeared as though they were each ejecting a vast flame of fire. At this time the lava flowed in great abundance, taking its course towards Portici and Resina. The inhabitants of Torre del Greco, rejoiced to find a prospect of their escape from the destroying fluid, were assembled together to return thanks for their deliverance, and to supplicate for their unfortunate neighbours, when they received the melancholy tidings that the lava had changed its direction, and was approaching their city. In flowing down a declivity, it had divided itself into three streams; one directing its course towards S. Maria del Pagliano, another towards Resina, and a third towards La Torre.

During the whole of this time the mountain was greatly convulsed, and deep hollow sounds were heard, which, together with the impetuous ejection of the lava, shook the mountain itself to its very base. When the oscillatory motion of the mountain ceased, the sounds became less frequent, but more distinct; the lava flowed more abundantly, and the action itself seemed as though it were suffering under the last paroxysm of its dying energies. This was about four o'clock in the morning of the 16th, and at that time the intumescent mass had spread itself through all the streets of Torre del Greco, and thence had flowed into the sea, forming a current at that place 1127 ft. broad; nor was it stayed by its contact with the waters, but covered the bed of the sea 362 ft. beyond its margin. The whole distance from the point of ejection to the place where its progress was arrested was 12,961 ft.

During the progress of the eruption the summit of Vesuvius was perfectly quiescent, and nothing remarkable was observed round its crater. But towards the dawn of day the heights of the mountain were hidden by a dense cloud of comminuted sand, which, by degrees spreading itself, in a short time covered the whole scene; the sun was darkened, and the heavens were covered by a mantle of impenetrable clouds.

That imagination must be unusually strong which can bring before it the horrors of that night. The fiery ejections of Vesuvius, the flames of the burning Torre, the inexpressible groans of the mountain, the deathlike stillness of the atmosphere, and the cries of the thousands who had been driven from their homes and all the pleasures of life, must, together, have presented a picture to the observer which no imagination can realise.

But it was not on the western side only that the lava spread its destructive effects. There was also a current on the east, which was ejected from a less elevated crater. This stream flowed into and filled the valley of Torienta, which was 65 ft.

wide, 120 ft. deep, and 1627 ft. long. From this valley it took its way into the plain of Forte, when, like the western stream, it divided itself into three branches, which severally took their courses towards Bosco, Mauro, and the plains of Mulara. The dimensions of this current were not above half that on the western side.

On the morning of the 16th the lava ceased to flow, and the crater was covered by a dense cloud of comminuted pumice, which enveloped it the four following days, during which time the summit of the mountain fell into the internal cavity. The surrounding country, to the distance of ten or twelve miles, was wrapped in palpable darkness, and thunder storms were awfully frequent. The average depth of the sand that fell during this period, for a distance of three miles round Vesuvius, is said to have been 14½ in.

On the 20th the mountain again appeared, but in a state of partial eruption: for it was not till after the violent rains which followed had fallen that it ceased to eject ignited masses, and that surrounding nature resumed its wonted appearance. But how awful soever the effects of this eruption may appear, they are not to be compared with those phenomena which attended the activity of Tomboro, in the Island of Sumbawa, in the year 1815. For the knowledge we have of the eruption of this mountain we are indebted to our late excellent and learned countryman, Sir Stamford Raffles.

The convulsions of Tomboro commenced on the 5th of April with loud rumbling sounds, which continued till the 7th of that month, when three columns of flame burst forth from near the top of the mountain. A short time after the lava began to flow, the mountain appeared as though it were a solid body of fire; but, notwithstanding its vivid glare, it was entirely obscured at eight o'clock, about an hour after the ejection of lava, by a thick cloud of sand. Between nine and ten o'clock ashes fell, and a whirlwind arose which struck to the ground almost every house in the village of Sangar, and carried away with tremendous force the lighter parts, uprooted the trees, and swept away both men and cattle in its fury. About midnight the explosions commenced, and continued with intense violence till the evening of the 11th inst., without intermission. After this they moderated, but did not entirely cease till the 25th of July. Of all the villages round Tomboro, only one, Tempo, escaped the destruction, and, out of 12,000 inhabitants, only twenty-six were saved.

The extreme violence of this eruption will be most evident from the knowledge which the inhabitants of distant islands had of its action. The fall of the ashes forty miles distant was so heavy, that the houses were considerably damaged, and in many instances rendered uninhabitable. In Java, 300 miles distant, the detonations were so distinct, and so much resembled the discharge of artillery, that a detachment of soldiers were marched from Djocjocarta, under a supposition that there was an attack upon a neighbouring military post; and on the sea shore they were mistaken for the guns of a vessel in distress, and boats were in two instances sent to give relief.

On the 6th the sun was obscured, the atmosphere became close and sultry, and every phenomenon, even at this distance, seemed to foretell an approaching earthquake. On the 10th the noises were louder; and at Sumanap and Banynwangi the earth was shaken violently by them. Gresie and other districts more eastward were enveloped, during the greater part of the 12th of April, in indescribable darkness; but as the clouds of ashes passed over, discharging themselves on their way, light returned; but it was not till the 17th, when a heavy shower of rain fell, that the atmosphere was cleared of its clouds of heated vapour and sand. The ashes were 9 in. deep at Banynwangi.

This eruption of Tomboro was heard at Sumatra, 970 miles distant, and indeed in the whole of the Molucca Islands. But so dreadful were its effects along the north and west of the peninsula, that but one solitary vestige of vegetable life was preserved, and the famine which followed at Sangar was hardly less dreadful in its effects than the burning lava.

These two instances of eruption from aerial volcanoes in the phase of prolonged intermittences would perhaps be sufficient to give a general notion of the phenomena which attend their activity; but as a far more definite opinion of their extensive effects may be obtained from the detail of particular instances than a mere enumeration of general results, we may, perhaps, be allowed if we introduce one other example.

The volcano of Jorullo is situated between Colima and the city of Mexico. Previously to the year 1759, the space which is now occupied by the mountain was a cultivated plain, though composed of ancient volcanic rocks, and consequently subject to igneous action. But in the traditions of the inhabitants we gain no information concerning the time of its formation.

In June, 1759, loud rumbling sounds were heard, and frequent earthquakes succeeded, which continued nearly two months, but in the early part of September had entirely died away, and tranquillity seemed to have been restored.

But on the 28th of that month the noises were again heard; and, during that and the following day, a space of ground from three to four miles in extent was elevated in the form of a bladder. At the same time, flames issued from a space about half a square league in superficies, and large fragments of rocks were ejected. The rivers of Cuitimba and San Pedro were precipitated into the chasm, and seemed to increase the violence of the eruption. From the plain thousands of little cones, called hornitos (ovens) by the natives, were formed, and columns of smoke were projected. In the midst of this, in the line of the chasm, bearing N.N.E. to S.S.W., six larger cones were thrown up, the least being three hundred feet above the level of the plain: Jorullo, the largest, is sixteen hundred feet. From this elevation immense quantities of basalt, lava, and fragments of primitive rocks were ejected, almost without intermission, till the following February, when the action became less violent.

Humboldt visited this mountain twenty years after the eruption, and the lava was then in a heated state. Since that time it has been again active; but, although it was so long ago as 1819, no authentic information concerning its phenomena has reached us.

Before we pass on to the consideration of subaqueous volcanoes, it will not be unnecessary to remark that there are two classes of phenomena usually attending aerial eruption, which are generally either partially described, or altogether overlooked, by those who detail volcanic phenomena. We refer to the electrical state of the atmosphere, and the alteration in the level of the surrounding waters. But as these effects of volcanic activity may perhaps lead to the establishment of some rational explanation of its cause, we hope that future observers will carefully examine them, and endeavour to overcome those difficulties which necessarily oppose their experiments.

The number of subaqueous volcanoes with which we are acquainted is very small. When we consider how much the greater portion of the surface of our globe is covered by water, we may at first be surprised at this fact; but we must remember that it does not arise from the inactivity of the volcanic agent beneath our seas, but from the elevation of cones above its level. An eruption of any considerable violence must of necessity form an elevation that will come under the class of aerial volcanoes, and hence it is that the majority of these are in islands.

There is much difficulty in obtaining specific information of the phenomena which attend the activity of subaqueous volcanoes. That the eruptions are as numerous as from subaerial craters there can be no doubt, but they are much less liable to be observed. It is a singular fact, that we are acquainted with scarcely an instance of subaqueous eruption that has not produced an island, and yet it may be reasonably supposed that many do occur which have not sufficient energy to elevate the mineral masses above the level of the sea. This circumstance may be accounted for in two ways. It is probable that the volcanic vent is sometimes superposed by so great a depth of water that no effect is produced on the surface by the eruption; at other times the energy which is exerted is sufficient to occasion many phenomena on the surface of the water; but no observer is present, and therefore, in this instance, as well as the other, we gain no information concerning the activity.

The most remarkable subaqueous eruptions of which we have any account are those which have troubled the Sea of Azof, the Azores[*], and the Island of Santorino in the Grecian Archipelago: we shall only dwell upon the phenomena which attended the latter.

The Island of Santorino, in the Grecian Archipelago, was formerly known by the name of Thera. Pliny, speaking of it, says, "There is a tradition that it rose out of the sea;" and supposes it to have occurred in the 135th Olympiad, or about 237 years B. C.

By the agency of a subaqueous volcano in the neighbourhood of Santorino, several islands have at various times been formed, and perhaps Santorino itself had its origin from the same cause.

Hiera rose from the sea in the year	197 B.C.
Thia - - - -	40 A.D.
Thia and Hiera were united -	726 A.D.
Little Kamenoi was formed -	1573 A.D.

On the 22d of May, 1707, the volcano again burst into action, and the islands around were violently agitated by an earthquake. On the following morning a new island, Isola Nuova, was discovered. A few days after, several persons ventured to land, the agitation having apparently subsided; but during their stay the island began to tremble exceedingly, and they hastily left the treacherous ground on which they had trespassed.

In July there arose, at a distance of about sixty paces from the new island, a ridge of black rocks, from which torrents of smoke issued. The inhabitants of Santorino were greatly alarmed at this new phenomenon; and so prejudicial was the vapour, that many of the inhabitants were killed by inhaling it, and all, more or less, felt its effects. On the 31st the sea seemed as though ready to boil, and in two places near the island revolved in circular eddies. During the whole of this time the volcanic agent was in a state of great activity, but varied in its manner of operation.

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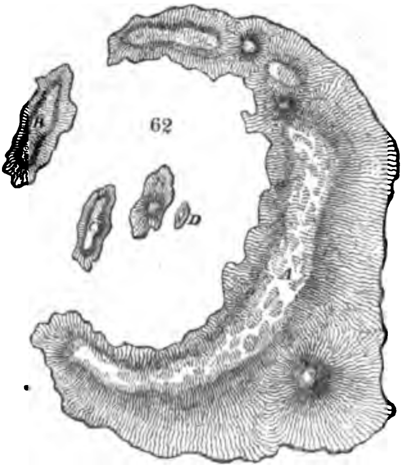
[*] See an account of the formation of the Island of Sabrina, *Phil. Trans.*, vol. cii. p. 152.

On the 23d of May, the phenomena assumed a less terrific aspect, and from that time gradually decreased in violence; but during the following ten years the volcanic agent continued in a state of partial excitement, the surrounding islands were occasionally troubled with earthquakes, and the inhabitants alarmed by subterranean noises.

The following sketch (*fig.* 62.) may bring to mind the relative positions of the island group.



A, Santorino. B, Therasia. C, Hiera.
D, Little Kamenoi. E, Black Island, formed in 1707.

The Island of St. Michael's, which is the largest of the Azores, is described by Dr. Webster as entirely formed of volcanic rocks. It is famous for the number of its hot springs, which are greatly impregnated with sulphuric acid, and sulphuretted hydrogen. Several subaqueous eruptions occurred in its neighbourhood between the years 1638 and 1720. From the latter date to the year 1811, the volcanic agent remained in a state of repose; but during that year it again burst into action, and a new volcano was formed. This product of its throes stood about 300 ft. above the level of the sea, and was about a mile in circumference, but after a short time sunk again into its watery bed. This is frequently the case with islands formed by submarine action. During the time of eruption, columns of smoke rise from the sea; the waters are much agitated, and rendered very impure; scoriæ and lava are ejected; and at last an island is formed, which is fated to sink into its watery bed a few hours after it has been raised.

(*To be continued.*)

COLLECTANEA.

Art. I. *Zoology.*

The Domestic Cat catching Swallows on the Wing. — Sir, In p. 84. an allusion is made to the capture of swallows by cats. The following instance, which I witnessed, is not only an indisputable confirmation of the fact, but exhibits in a still stronger degree the calculating instinct, if I may so express myself, of certain animals in the pursuit of prey. A few years ago, when walking up a narrowish street in the town of St. Hélier, in the Island of Jersey, during the month of August, I observed, far ahead, a swift (*H*irúndo *A*pus) darting towards me, about a foot or two above the ground, uttering, as usual, its well-known screaming note. I had scarcely observed it on the wing, before its rapid flight brought it close to the pavement where I stood, when, at the instant of its passing, I was surprised by a sudden and somewhat smartish blow on my feet. On looking down, to ascertain the cause, I was not a little astonished to find it proceeded from a cat, which I had previously noticed sitting, apparently dosing, at a gateway on the opposite side of the street. She, however, had seen the descending bird, and so nicely calculated her pounce, as to impinge upon her victim with unerring certainty; for the unfortunate bird, after a momentary struggle, was secured in her mouth, and carried off in triumph into a house. Struck with the singular incident, I also entered, and mentioned to a woman who was within the active feat of her cat. In reply, she assured me that such captures were by no means new to her, scarcely a day passing without similar attempts on the part of her favourite, and frequently with the success I had just witnessed. — *E. S.*

I once saw two martins (*H*irúndo úrbica) buffeting each other on the wing, near the ground, opposite the paling of a cottage garden, from under which an observant cat rushed out upon them, captured one of them, and bore it back to the garden in triumph. The birds were buffeting each other at the distance of six yards from the paling whence the cat emerged; but so rancorous was their conflict, that they could perceive only each other. Myself and a companion were within a few yards of them. — *J. D.*

The Domestic Cat springing at Swallows, and other Feats by it. — Sir, At p 84., J. D. describes with great truth and fidelity the mode in which swallows attack the cat, and the cunning and agility which the cat in her turn evinces, in endeavouring to catch the swallows on the wing, as they dash by her. I have often witnessed these encounters, and have been much amused in watching a cat of my own, which would lie flat on her belly with her paws extended, and in that position would, with an agility equal to that of any harlequin in a pantomime, suddenly leap up from the ground into the air full 3 ft. high at the passing swallow. J. D. says that on these occasions he "never knew the cat catch a swallow:" neither did I ever *see* her do so; but I have no doubt of her occasional success, independently of the testimony borne to the fact in the passage quoted in the same page from the *Verulam*; for the same cat I have above alluded to once brought to me a swallow alive in her mouth. She leaped up with it to the outside of my sitting-room window (at which she was accustomed to be let in, to display, as it were, the trophies of her victory. Observing that the swallow was alive, I took hold of the cat, and with my thumb and finger opened her jaws, when, to my no small satisfaction, the bird instantly flew away unhurt, and as brisk as ever, twittering its shrill note in celebration of its escape from so perilous a situation.

The interesting extract from the *Verulam*, above alluded to, is, in the main, just and true; but I cannot help thinking the writer is in error, when he states, "the simple swallows, dreaming of no harm, and thinking they can here make a good meal, dip down from the barren air, dart with open bill upon the flies," &c. On the contrary, I apprehend the swallows are fully aware of the danger, and do not approach the cat for the sake of feeding upon the flies which may have collected about her, but rather with a view to banter her, and express their jealousy and hatred of a well-known enemy, upon the same principle as they also, as well as other small birds, mob and attack hawks and birds of prey. I think, too, that the writer in the *Verulam* is hardly borne out by facts, when he speaks of the cat's "*unerring success whenever a swallow ventures within her reach.*" I believe that it is a thing of rare occurrence for the cat on these occasions to succeed in capturing a swallow; though, as already stated, I do not doubt the fact in particular cases. I can only say, that, repeatedly as I have witnessed these encounters, I never yet saw the cat actually succeed, not even when the swallows have approached so near as to touch her, as they sometimes will do.

It is a prevailing opinion, and one which, *a priori*, sounds plausible enough, that cats which are regularly fed and much petted (*parlour boarders*, as it were), are thereby spoiled as mousers (see this opinion stated Vol. IV. p. 513.), and rendered as useless in their trade as ladies' lapdogs. This, however, though it may be true in particular instances, is very far from being invariably the case. I have known many instances of favourite cats, petted and well fed, which yet have proved most expert and diligent in their proper calling, and, I may say, at the head of their profession, destroying all kinds of vermin, as well as birds, reptiles, and insects; and among the latter the common white butterflies, moths, and cockchafers, which puss would catch with great adroitness, and somewhat grotesque agility, while on the wing. Yours, &c. — *W. T. Bree. Allesley Rectory, Jan.* 11. 1832.

Cats, like many, if not all, domestic animals, are the best servants when well fed. The half-starved cat is a cunning, thievish, cowardly creature, more likely to fly from than at a rat; but when in heart is bold and active, appearing to delight in the pursuit of vermin, and to enjoy it as an agreeable amusement, as he kills more than he eats. Some cats have even been trained to assist in killing vermin on the removal of corn-ricks, and they kill them with far greater quickness and certainty than the terrier. — *J. C. Farmer. Nov.* 29. 1831.

Feline Sportsman. — I saw a cat at Dorking, last summer, who pursued mice with true sportsmanlike feeling. He never eat his game, but uniformly laid it at the feet of the first person he found of the family, and, having drawn attention to his trophy, walked away with an air of proud satisfaction to the performance of fresh exploits. — *J. W. L.*

The article by Cattus, Vol. IV. p. 511., and the remarks by A. R. Y., Vol. V. p. 51, 52., and the note, are farther amplifications of feline history. — *J. D.*

A Kitten resembling a Rabbit in its hinder Half. — Sir, As you admit physiological subjects, perhaps the following may not be unacceptable to some of your readers. The subject is the production of a domestic cat; and amongst the five kittens she produced is one which, from its singularity of appearance, excites general observation. Its head, teeth, fore legs, and claws, and its body to the termination of the short ribs, are those of a perfectly formed cat; the hind quarters, with the short turned up tail, legs, and claws, bear every resemblance to a rabbit, and these parts have the action peculiar to that animal. The singularity of the contrast is particularly remarkable; the animal having the playful tricks of a kitten, while its hind quarters are too clumsy and slow-motioned to correspond with the quick and lively movements of its fore half. In running, it has the action of a kitten with its fore legs, and the hop of a rabbit with its hind. I do not mean to say the separation is as distinctly marked as in the fabled mermaid; but still it is sufficiently obvious for the most casual observer to remark it. In a physiological point it is remarkable that two animals of such opposite natures as the cat and rabbit should unite, and the produce partake in so distinct a manner of both species. I cannot think it possible to have been produced without the intervention of both, nor that the remainder was the produce of the same male, as they are all perfectly formed kittens. I much regret I cannot give the anatomical description of this singular animal, being neither a medical nor a scientific man. It was about seven weeks old when I last saw it at a farm called Meering, about eight miles from Newark. I am, Sir, yours, &c. — *Rusticus. Oct.*, 1831.

In the garden sheds of Lord Calthorpe, Ampton Hall, and of Nathaniel Lee Acton, Esq., Livermere Hall, (two splendid residences in Suffolk, about five miles from Bury St. Edmunds,) there were, in 1828, and I have learned still are, cats kept, each of which was kittened with an abruptly terminated or retuse tail, not exceeding 2 in. in length. I was informed by the persons who showed them to me, that the short-tailed property had continued through more than two generations; and that in the litters of kittens produced by these cats, about half were short-tailed ones, the others long-tailed, as usual. On writing to and asking a friend, a patron of cats, which I did at the time, if he would accept one of these short tails, I remember he replied, "No; I thank you. When I behold my Jupiter (the name of his cat) seated on the hearth, forming one of the family circle, and observe his fine long tail disposed in a graceful curve about his person, with its extremity reposing on and covering his fore-paws, I cannot but prefer him to all the short-tailed cats in the kingdom." — *J. D.*

A Gigantic Female Hare. — A female hare (*Lèpus tímidus*), of unusually large size, was recently sent to London from Norfolk, which weighed 13 lbs. 1½ oz. The mammary glands were large, but she was not with young. The specimen was sent to Mr. Leadbeater, to whom I am indebted for the information. — *A. B. Feb.* 16. 1832.

Ornithological Reasonings. — Sir, The following singular occurrence is related in the *United Kingdom* newspaper of this day (Feb. 19.). It originally appeared in a provincial Journal, the *Westmoreland Gazette.* If it be really a fact, it is deserving of more permanent record than that afforded by the columns of a newspaper.

"Last week, as Mr. A. Metcalf, keeper to Lord Lowther, in Ravenstonedale, was ranging the fields with his gun, he observed a hawk hovering near him; and while preparing to e it a shot, a fieldfare flew in terror against his breast, and then perched upon his shoulder. He fired at the hawk with the first barrel (while the fieldfare sat still), but missed; the hawk, intent upon his prey, disregarded the shot; with the second barrel he brought the bird down. The fieldfare left his shoulder, and fluttered for a short time around its fallen and dead enemy, uttering a chirp of joy, and then winged away from its friend and unexpected protector."

Were the illustrious author of *Zoonomia* [Dr. Darwin] alive, what inference would he deduce from a fact such as this? Must we not allow something more than *instinct* to account for such a circumstance? — *J. J. Feb.* 19. 1832.

Cruel Love. — Being in the country, near Woking, Surrey, last week, I was witness to the curious fact of a female sparrow killing her husband, not from either hatred or jealousy, but from love. The pair were in search of a place for building their nest; and the male bird finding a tempting hole among the tiles of the roof, got into it: unfortunately, he became entangled in the broken mortar, and could not force his way back. The female saw his situation, and after flying backwards and forwards several times, twittering, and apparently in great distress, she attempted to pull him out. Several birds were attracted by the accident, and came fluttering round, but were beaten off by the female sparrow. She then redoubled her own efforts to extricate the male, and, getting hold of his beak above the nostrils in her own beak, she pulled it so hard that she killed him. She did not, however, appear aware of the mischief she had done, but continued pulling at the dead body of her unfortunate mate, with as much perseverance as she had done while he continued alive. My man, who saw the whole transaction, at last drove her away, and with some difficulty extricated the dead bird. Its head was dreadfully mangled; and the beak of its mate had evidently penetrated the brain. About an hour afterwards I again passed the place, and saw a bird, which I supposed the female, sitting on the very spot where the accident had happened, crouched together, with her feathers all standing up, so as to give her the appearance of a ball, and certainly looking the very image of a disconsolate widow. — *J. W. L. April* 11. 1831.

The Cuckoo (Cúculus canòrus) *prefers to lay in the Wagtail's Nest.* — A Pair of Pied Wagtails (*M*otacílla álba) fixed their nest early in April among the ivy which covers one side of my house, and reared and took off their young. A few days after the young birds had left the nest, I observed the old birds apparently collecting materials for building, and was much amused at seeing the young running after the parent birds, and, with imploring looks and gestures, demanding food; but the old birds, with roots or pieces of grass in their bills, seemed quite regardless of them, and intent on their new habitation. Their motions were narrowly watched by a female cuckoo, which I saw constantly near the place, but the wagtails had placed their second nest within a yard of a door, and so well concealed among some luxuriant ivy, that the cuckoo being often frightened away, was not able to discover the nest. The intruder being thus thwarted in its design, the birds hatched their second brood, which was accidentally destroyed a few days after. In about ten days they actually commenced their third nest, within a few feet of the situation of the second, and brought off their brood in safety. I have repeatedly taken the cuckoo's egg from the wagtail's nest; in this locality it has a decided preference to it. I do not recollect, excepting in two instances, finding it in any other, once in the hedge-warbler's, and another time in the redstart's nest. In this vicinity whether the wagtail selects the hole of a pollard tree, a cleft in the wall, or a projecting ledge under a bridge, it does not often escape the prying eye of the cuckoo, as in all these situations I have frequently found either egg or young. The cuckoo appears to possess the power of retaining its egg for some some time after it is ready for exclusion. On one occasion I had observed a cuckoo during several days anxiously watching a pair of wagtails building; I saw the cuckoo fly from the nest two or three times before it was half completed; and at last, the labour of the wagtails not going on, I imagine, so rapidly as might be wished, the cuckoo deposited its egg before the lining of the nest was finished. The egg, contrary to my expectation, was not thrown out; and on the following day the wagtail commenced laying, and, as usual, the intruder was hatched at the same time as the rest, and soon had the whole nest to itself. I once observed a cuckoo enter a wagtail's nest, which I had noticed a short time before to contain one egg; in a few minutes the cuckoo crept from the hole, and was flying away with something in its beak, which proved to be the egg of the wagtail, which it dropped on my firing a gun at it. On examining the nest, the cuckoo had only made an exchange, leaving its own egg for the one taken. In May, 1829, I found two cuckoo's eggs in the same nest, and depended on witnessing a desperate struggle between the parties, but my hopes were frustrated by some person destroying it. — *J. D. Hoy. Stoke Nayland, Nov.* 28. 1831.

The White-tailed Eagle breeds in Captivity. — I believe it is an unusual occurrence for any of the predaceous birds to produce eggs in a state of captivity. I have a white-tailed eagle (Fálco albicílla), which was brought from Norway about nine years ago, and was at that time in its adult plumage, so that its age cannot be ascertained, which has during this last summer produced three eggs. The eagle is confined under shelter of some fir trees, with a strap and cord about 20 yards in length. The bird appeared unwell during several days previous to laying the first egg, squatting close to the ground under the low branches of a fir tree during the greater part of the day, and taking but little food: it also formed a sort of nest on the ground with grass which it plucked up with its beak. It showed great symptoms of anger on any person's approach; spreading the wings, erecting the feathers, and at the same time uttering a low whining note. I had yet no suspicion of what was going on; but on the third or fourth day, still thinking the bird unwell, as it continued on the ground the greater part of the day, I determined on seizing hold of it to examine its condition; on lifting it, which the bird suffered me very passively to do, I perceived, to my great surprise, an egg. An eagle's egg not being very easily obtained, I took immediate possession of it. In the course of four days being during that time almost constantly on its nesting-place, it laid two other eggs, one day intervening between each egg. The eggs are the size of a goose egg, much rounded at both ends, of a bluish white colour, with a few faint-coloured rusty streaks, the shell thick and strong. A few days after laying the third egg, the eagle recovered its usual appetite and vigour. — *J. D. Hoy. Stoke Nayland, Suffolk, Nov.* 28. 1831.

A young Eagle (the species I am unacquainted with), which was wounded in the wing, has been kept for some time at Thrumpton Hall, the seat of J. E. Westcombe, Esq. It was obtained by a gentleman of this neighbourhood, whilst shooting over the moors in Scotland. It was kept in front of the mansion, under some large trees, chained by the leg to a tub; and was fed on rabbits, and birds of all descriptions. When I saw it, it was in full feather, and very fierce. I understand it has since been destroyed, and in the following manner. Having obtained its liberty, it flew to a gate, some distance from its place of confinement, where a public footpath came through. A foot passenger (a stranger to the place, and consequently not knowing the bird,) wishing to pass through, the bird seemed determined to dispute the passage, and offered battle; the man, in self-defence, struck the royal bird over the crown, and caused almost immediate death, by fracturing the skull. Its domicile is now occupied by another; which, it is hoped, will not meet with so tragical a fate as did its predecessor. — *Scólopax rusticola. Chilwell, Notts, Oct.* 21. 1831.

Honey Buzzard.—Sir, On the 12th of October this season, a honey buzzard (Fálco apívorus) was shot in Tendring Hall Park, in this parish; the person who killed it saw it first on the ground; there were several wasps' nests near the spot. On dissecting it, I found a quantity of wasps and nymphæ from the comb both in its craw and stomach, with a few small beetles. It was a male, and very fat: the plumage of a deep brown colour, the feather of the back and wings margined with a paler brown, the breast feathers marked with a darker streak of brown in the centre of each feather; tail long, crossed with three broad bars of a deep brown, between which were three other narrow bars, tip white; the legs shorter than those of the wood buzzard, and very thick and strong. The colour of the irides a fine dark hazel; cere orange yellow. The beak is more lengthened than in the common buzzard, and the claws straighter, and not so sharp. It would be highly interesting, could we be made acquainted with the manner in which this bird conducts the attack on a wasp's nest. That the wasp, with its larva, is its favourite food, seems pretty evident from the accounts of most naturalists who have described it; the close set, thick, and rather stiff feathers, which surround the head and throat, are probably intended for protection. From the description of Willoughby, and White of Selborne, it should seem that wasps and their grubs formed a considerable part of its food even in the breeding season, at which time those insects are in full vigour, otherwise we might have supposed that the bird only attacked those nests in autumn which had been partially destroyed. The hawk, in order to get at the comb, must in some way enlarge the entrance: the legs and claws of the bird I have described were very dirty, even to the knee, most likely from searching much on the ground for food, and using them in making an entrance into the wasps' nests. At many periods of the year, if the hawk is really indigenous, it would be necessitated to resort to other insect food and reptiles; but I think it very doubtful whether it winters with us. I am strongly of opinion that it is found and breeds here more frequently than is imagined. Mr. White mentions a nest in this neighbourhood; and according to Willoughby, who gives a good description of it, it was not at all uncommon in his time: its appearance, except on a close examination, is like that of the wood buzzard; so much so, that I am confident most gamekeepers, who are the persons that destroy the greatest number of the hawk species, would pronounce it such, and nail it up on their vermin pole. Again, from its habits it would not be taken in their traps, but only obtained by the gun. I recollect a specimen shot about ten years ago, at Gipping Hall in this county, during the summer months; and I have not the least doubt that there are many woods in this kingdom, where the honey buzzard might breed undisturbed and unknown.

The ash-coloured harrier was long supposed to be confined to the south-western parts of England. We have lately discovered that it breeds annually in the fens in the north-western part of this county, and most likely throughout the whole extensive level of fen from that, through the Isle of Ely, to Whittlesea Mere. A fine young osprey in its nestling feathers, evident from the down on the wing coverts and scapulars, was shot in this parish on the 17th of August this year; the plumage is handsome, and more mottled than in the older birds. — *J. D. Hoy. Stoke Nayland, Suffolk, Nov.* 30. 1831.

Fálco T*innúnculus* Lin. (*Kestrel*), *its Mode of killing Prey.* — I observed that a male kestrel, which I kept for some time, invariably crushed the head of the animal I gave him for food with his beak, previously to devouring it. I am not aware whether or not others of the carnivorous tribe adopt the same mode of killing their prey; from the bird being young when I first had him, I presumed that it is either an instinctive habit of the race, or that he learnt it from the parent birds. This bird frequently breeds in the cliffs on the sea shore, among the gulls and other waterfowl. In the summer of 1830, I shot a female as she flew from her nest, which was situated within a few yards of a nest containing the young of the common gull (*L*àrus cànus *Lin.*). — *W. R. Jordan. Lugehay, Teignmouth, Devon, Dec.* 4. 1831.

The Butcher Bird (*Lànius* C*ollùrio*). — Sir, Whilst walking, in the month of July last, along a narrow lane, my attention was directed to the shrill cries of two or three small birds surrounding the branch of a tree lying by the roadside, and on approaching the spot, to discover the cause of their seeming anger as well as alarm, a species of the butcher bird (the red-backed shrike, or Lànius *C*ollùrio of Linnæus) rose up, with a young, though full-grown, bird of the finch tribe in its beak, which it with difficulty conveyed to a neighbouring tree. On my disturbing the bird, it flew onward, nowise intimidated, with its prey, and, turning a corner of the road, for a time eluded my close pursuit. However, whilst watching, for a minute, at a gateway, I saw the butcher bird flying across an angle of the field at a short distance, and, on my arriving at that part of the hedge whence it flew, I directly discovered its little victim suspended on a dead branch; its neck being ingeniously transfixed by a thorn. I searched for the nest, but without success; yet I have no doubt there was one near at hand, as the male butcher bird (the one in question being a female) remained in a neighbouring tree watching my motions, and when scared kept hovering near the place. It was, of course, in consequence of my interruption that the female left her prey, which she would return to on my departure.

I am induced to write these particulars, because, although it is a well known fact that some of the species prey on smaller birds, yet I do not imagine that such a clear example, by one of the lesser butcher birds, often comes under the personal observation of persons interested in the subject. I am, Sir, yours, &c. — *Somersetensis. Dec.* 6. 1831.

Notes on the Gray Phalarope (*Trínga lobàta* Lin.). — This elegant little aquatic is a most expert swimmer. I have rarely met with it in this neighbourhood, until within the last two years, in the autumns of which several have visited our shores. Captain Sabine notices it as abundant in the North Georgian Islands. — *W. R. Jordan. Lugehay, Teignmouth, Devonshire, Dec.* 4. 1831.

The Forked-tail Petrel and Gray Phalarope taken near Chipping Norton, Oxon. — On the 16th of December, 1831, a species of petrel was found dead, in a turnip field, near Chipping Norton. It nearly accords with the description of the forked-tail petrel (Procellària Leách*ii* Temminck) in Bewick's *British Birds.* Its weight is 1 oz., length 7½ in., breadth 18 in.; bill black and hooked, nearly three quarters of an inch long; nostrils enclosed in a prominent tube; head, neck, and back, slate black; forehead more dusky; under parts sooty black; upper tail coverts white, the under ones black; outer margin of the scapulars edged with white at their tips; primaries and secondaries black; wing coverts light brown; tail black and forked, of twelve feathers, the six middle ones equal in length; legs and feet black. It possessed a peculiar kind of smell, not unlike that of the common bat (*V*espertílio *m*urìnus *L.*). When found, it was quite fresh, the eyes scarcely altered, and the feathers perfectly clean and undisturbed. The person who brought it to me thought it was a kind of swallow, and would have thrown it away, had he not observed its webbed feet. The late storms probably drove this bird so far from its favourite element; and want of proper food, combined with fatigue, most likely caused its death: it is quite a rarity in this midland county. Dr. Latham, in his *General Synopsis of Birds,* describes the forked-tail petrel as being 10 in. long; and says it is found amongst the ice between Asia and America. No mention is made of it in Rennie's edition of *Montagu's Ornithological Dictionary.* Is the above properly a distinct species, or only a variety, of the stormy petrel (Procellària pelágica)?

The Gray Phalarope (Phalàropus platyrhýnchus *Tem.*) was shot within six miles of this town, in October last. Both these birds are in my possession. — *T. G. Chipping Norton, Oxon., Dec.* 31. 1831.

In our Vol. III. p. 325. will be found an interesting description, both of the almost inaccessible situations in Shetland and Orkney in which the stormy petrel (Procellària pelágica) breeds, and of the ingenious yet hazardous means used by the inhabitants to capture the young birds; the description immediately suggests the recollection of Shakspeare's *King Lear*, and " samphire-picking, dreadful trade."

The superstitions which have hitherto been, and, it is too probable, long will be, associated with the stormy petrel, are met by some rational and philosophic remarks, in Rennie's *Montagu's Ornithological Dictionary*, under the article Petrel, p. 361. — *J. D.*

The Forked-tail Petrel (*Procellària Leáchii*), *and a Species of Tern found dead inland.* — " Several stormy petrels appeared last week in this and the adjoining counties. One was found dead in this vicinity on Saturday, doubtless killed in the severe hail storm on Friday night. The stormy petrel is not larger than a swallow, and its colour is black; except the coverts of the tail, the tail itself, and the vent feathers, which are white. Its legs are long and slender, and it is web-footed." (*Hereford Journal*, Dec. 21. 1831.) I was fortunate enough to obtain two of these wanderers, which were, most probably, driven from the coast by a violent gale of wind; but neither of my specimens is the stormy petrel. The one is the forked-tail petrel (Procellària Leáchii); the other a tern, which I cannot identify with either of Bewick's descriptions of the species. I imagine it to be a last year's bird, of the gull-billed tern (Stérna ánglica), the under mandible of the bill being angulated. Both specimens were found dead. I am, Sir, &c. — *J. A. H. Ringtôn, Herefordshire, Dec.* 24. 1831.

Two Stormy Petrels taken at Birmingham. — On the 13th of December, 1831, owing, it is supposed, to a continued gale of wind, which blew from the south-west during the day and night previous, accompanied with violent storms of rain, two stormy petrels were taken near this town, both nearly dead from exhaustion. One was found in Bradford Street, and is now placed in Weaver's Museum; and the other was found on Washwood Heath, which is situated about three or four miles to the north-east of the town, and the bird is now in the possession of the gentleman who picked it up. — *C. Birmingham, December* 15. 1831.

The Imber (*Colýmbus* I'mmer *Lin.*). — A fine specimen of this bird was shot in the river Teign, in the autumn of 1830, and is now in the collection of H. H. Hele, Esq., of Ashburton. This bird is, without doubt, the young of the *C.* glaciàlis (in the above specimen the rings on the neck are very apparent), common on the coast of Newfoundland and Labrador. — *W. R. Jordan. Lugehay, Teignmouth, Dec.* 4. 1831.

Notes on the Starling (*Stúrnus vulgàris*). — Large flocks of this bird resort to the fir plantations in this neighbourhood, to roost during the winter and latter months of summer; they also take up their quarters for the night in the reed beds in the immediate vicinity of the river Trent. These birds are often seen in company with the rooks (*C*órvus frugílegus), and are in the habit of frequenting pastures with their larger companions. Their food, possibly, consists of the same species of worms, slugs, grubs, &c. They fly round their roosting places many times, performing numberless curious evolutions, before they finally settle for the night, and in such compact bodies, that immense numbers of them have been brought to the ground by a single discharge of a fowling-piece. On June 23. 1831, I saw a large flock, probably four or five families, flying towards their roosting place, which I considered rather early. White ones are sometimes seen; I observed a *rara avis* of this description amongst his darker companions last winter. They will often build under the rooks' nests in the rookery, and thus appear something like dependants. — *Scólopax rustícola. Chilwell, Oct.* 21. 1831.

The following Remarks on the Starling are incidentally presented in the *Grámina Británnica* of J. L. Knapp, Esq. F.L.S., author of the *Journal of a Naturalist.* They will be found under the description of the common reed (*A*rúndo *P*hragmìtes), plate 95.: —

" *A*rúndo *P*hragmìtes is a plant that the agriculturist pays no attention to, but to eradicate; yet in rural economy it justly holds a distinguished rank: in many of the lowlands in the counties of Huntingdon, Cambridge, and Lincoln it constitutes the crop of the soil, and is harvested with considerable care, and from thence is exported and spread through the neighbouring counties, being made use of as a thatch for barns, cottages, and outhouses; which proves to be less expensive, and more durable, than other vegetable materials. The injury that is done, towards the end of autumn [reed is not cut until after Christmas], to this valuable crop, by birds, is so great, that the farmer of the watery district is necessitated nightly to despatch boats with [men and] fire-arms to scare them away. As the evening begins to close, one sees clouds of starlings (Stúrnus vulgàris) approaching from various quarters, in numbers that exceed all belief, to pass the night in the reeds; and, lighting in myriads, like the locusts of the East, upon this flexible plant, they crush it to the water; and one sees large patches lodged and beat down, like grain after a storm. Though the guns of the boatmen sweep them away by hundreds, the survivors are so drowsy that they remain stationary, or move only a few yards from the bodies of their slaughtered companions, and return on the ensuing evening in numbers not apparently diminished, and with a total oblivion of the carnage of the preceding night."

To the above remarks the author appends, as a note at the foot of his page, these:—"There is reason to think that the starling migrates from other countries into England towards the commencement of winter: this kingdom never breeds the myriads that collect to roost on *A*rúndo *P*hragmìtes. The farmers of the districts have assured us that they commonly destroy bushels of a night. Foxes and other vermin assemble in the reeds, to fatten upon the poor starling, which they either find asleep or disabled by the fire of the nightmen."

See also incidental mention of the habits of the starling by Mr. Waterton, in his remarks on the rook, p. 243. The starling, besides consuming the earth-worm, will pillage cherry trees of their ripe fruit.—*J. D.*

The domestic Pigeon eats raw Potatoes. — After the potatoes are peeled, the eyes or buds are, as it were, scooped out with the knife's point, and these parts, not the peelings, are thrown into the street. A neighbour's pigeons instantly eat them, and have acquired the habit of looking out for them at the usual time; and the other day three of them had the audacity to attack and drive away a dunghill cock that was making rather free with their fragments of potato. — *Henry Turner. Bury St. Edmunds, February* 28. 1832.

Note on the House Pigeon (*Cólumba* Œ̀*nas* Lin. *var.*). — I kept a female of the blue rock variety nearly ten years. About twelve months before it died, it ceased to breed, and, I have every reason to believe, died of old age, after a few days' illness. — *W. R. Jordan. Lugehay, Teignmouth*, 1831.

Remarks on Swallows. — Sir, I send you some remarks, which I have made during the last summer, on that very interesting class of birds, the swallow; showing, I think, independently of that animal instinct which enables them to do so many curious things, that they reason and act, according to circumstances into which they are thrown, with as much sagacity and forethought as the most expert of human beings. The following three cases I witnessed myself during the last year: —

A pair of martins had built their nest in the corner of my window; I did not remark any thing particular during the time they were so employed, excepting that I perceived one of them was the same which had visited the same place the previous year. I knew it again, from a remarkable white feather in one of its wings. As soon, however, as all seemed finished, my attention was arrested one day by a great noise and bustle at the nest, caused by a stranger of the same family of birds trying to force its way into the nest at the time the two rightful tenants were within; and, notwithstanding their united efforts, he succeeded in entering, and driving them out. This same warfare, and similar expulsions, took place daily, for a week or more. One day, I remarked that the two rightful owners of the nest were very busy outside, and I soon perceived that they were engaged in lessening the entrance into the same; in fact, they soon reduced it so much, that they could scarcely force themselves into it singly. As soon as done, one or other constantly placed itself at the hole, with its bill protruding visibly without; and though the intruder made regular attacks upon them for a week or more, he never afterwards made any impression on them, and finally left them to enjoy the reward of so much sagacity and forethought. Surely no human being could have thought or done better to overcome the attack of an enemy on his house, than these birds did in barring up the entrance to their nest from their adversary.

The second observation will show great thought and reasoning in a pair of these birds, which took a fancy to build their nest in a corner, under an open staircase, in the yard of the house I inhabit. As the stairs sheltered them from wind and weather above, they gave up the additional trouble of putting on a top to the nest, as they usually do, and made the nest like that of most other birds, the boards above being shelter enough for them.

The third and last observation which I shall make, refers to the very strong attachment which these birds (swallows) must have to places where once they have found security; for this, I conceive, is the main principle which attracts them. On this same house is an old moving iron chimney, placed there to prevent it from smoking: the fireplace beneath, however, having been bricked up, it became a safe place for building in; and, no doubt, the birds remarked that it was such. In the very *hood* or top of this machine, moved about by every wind, and making withal a most hideous noise, from its being out of repair, I have seen these birds, for two succeeding years, build their nest; and often, for five minutes or more, when the wind has been high, I have seen them in vain trying to get into it; the constant motion of the chimney preventing them from entering their airy dwelling. The force of habit must be very strong to induce birds to choose so inconvenient a situation. No doubt, however, the feeling of security overcomes many other considerations. I am, &c. — *H. B.* *Blois, France, Jan.* 7. 1832.

The Pipit Lark distinct from the Meadow Pipit, or Titlark. — Sir, I shall feel obliged by your insertion of a few remarks upon the identity of the pipit lark; a species the nature and habits of which do not seem sufficiently understood. I have frequently observed a bird on Wandsworth Common, which the bird-catchers call the pipit lark, and of which, in the spring and autumn, they capture considerable numbers. The upper parts of the plumage of this bird are of a dark olive brown; the breast a dirty yellow, marked with brown spots; belly and vent yellowish white; the tail is olive brown, the exterior feathers white on the outer margin. The female and young may be described in nearly the same words, except that the plumage is not quite so dark as in the male bird. I have consulted several authors, but find no mention of this species being common in the neighbourhood of London. Bewick mentions a bird very similar to the present, but describes it as frequenting rocky promontories and isles near the sea shore; and all authors agree that this species, the field lark (*A*laúda campéstris *Linn.*), is found only in the neighbourhood of the sea coast. In Rennie's *Montagu's Ornithological Dictionary*, under the article Tree Pipit, I find (p. 517.) the following remark: — "Mr. Pennant says the birdcatchers about London take a bird in the autumn they call pipit, but does not describe it. We have great reason to believe that the bird so called is the meadow pipit of this work, certainly not the grasshopper warbler, which, we believe, has been called pipit; nor is it likely to be the tree pipit, which leaves us at that season in the same solitary manner it comes to us, and is never known to be gregarious in this country." Now, it would seem hardly possible that the lark which I have observed in our neighbourhood, from its dark plumage and slight make, could be confounded with the meadow pipit or titlark (*A*laúda praténsis), and yet, in this case, I am inclined to think such a mistake has been made. Montagu has evidently considered the two species one and the same: in this opinion, however, I cannot concur, having shot male and female birds of each species at the same time, both of which had nests and eggs. It is surprising to me that when the fact of the pipit lark's being a distinct species is known to every bird-catcher and every bird-nesting boy, ornithologists should have been so long undecided on the subject. I shall only mention, in conclusion, that the pipit, like the titlark, has a very agreeable warble, and sings hovering over its nest. I am, &c. — *Ornis. Wandsworth, Surrey, Dec.* 1. 1831.

The Alpine Warbler (*Accéntor alpìnus*) *met with in England.* — Sir, A few years since, I shot a small bird in a garden on the borders of Epping Forest, which I did not know, nor could any one tell me what it was, till within a fortnight a gentleman requested me to allow him to take it to London. He accordingly went to Mr. Gould, Naturalist, 20. Broad Street, Golden Square; who sends me an account of its being the Accéntor alpìnus, or Alpine warbler, the only one known to have been killed in England, with the exception of one, in Dr. Thackeray's garden, at Cambridge. If you think this worth inserting in your Magazine, you are at liberty to use it; or if any of your correspondents would like to see it, they can, by calling at my nursery, Wood Street, Walthamstow. I am, Sir, yours, &c. — *James Pamplin. Whip's Cross Nursery, Walthamstow, Jan.* 27. 1832.

M*otacílla Sýlvia* Lin. [*Currùca cinèrea* Brisson], *Whitethroat.*—This little warbler made it appearance in the neighbourhood of Teignmouth, this year (1831), as early as the 30th of March. It generally arrives about the middle of April. — *W. R. Jordan. Lugehay, Teignmouth, Dec.* 4. 1831.

The Spring, or Yellow, Wagtail (M*otacílla fláva*).—This active and graceful little bird has often afforded me much amusement, whilst watching its sedulous attendance on cows, when they are feeding; keeping within a foot or less of the heads of the animals. I have seen as many as seven, which I concluded were the parents and their offspring, running and dodging just before the cows' eyes, apparently catching some small insects. I suppose that the cows, in biting off the grass, disturbed certain small flies (which are the favourite food of this bird) lodged in the grass, and which, as soon as they arose, were entrapped by the watchful wagtail before they could secure their retreat into the grass. We thus see it demonstrated how one animal is subservient to the well-being of another; as it is evident that the bird could not secure its prey, which is far down in the herbage, until aroused by its friend the cow, which in this instance may not inaptly be termed the "wagtail's provider."

The Pied Wagtail (M*otacílla lòtor* Rennie, M. *álba* Linn.) may, I think, as far as some of its habits go, be classed amongst the waders; for a pair of these birds build regularly in an old hovel, very near a shallow rivulet which runs across the turnpike road, and are in the habit of running in it up to the belly in pursuit of flies or water spiders, which sport in hundreds over its surface: they will remain in the water for ten minutes at a time. A few years ago, a cuckoo (*Cùculus canòrus*) deposited its egg in the nest of these birds; and, in the course of time, the young foundling made its appearance, and took its station on the top of the thatch of the building, where it was carefully fed by its foster-parents. It was amusing to see the antipathy demonstrated by the swallows of the neighbourhood (who are ever ready to buffet an intruder), swoop at it with great vengeance in passing to and fro. The cuckoo made no defence, except throwing its head back, and opening its capacious mouth; but whether in fear or to intimidate them I cannot say. — *Scólopax rustícola. Chilwell, Notts, Oct.* 21. 1832.

Tomtit, or Blue Titmouse (*Pàrus cærùleus*). — I am aware that this little bird will choose curious places for bringing up its young, but the following surpasses all I ever before heard of. Some years ago, a man of the name of Tom Otter murdered his sweetheart at a place called Drinsey Nook, in Lincolnshire. The assassin suffered the extreme penalty of the law, and was gibbeted near the place where he committed the fatal deed. It appears, that whilst the carnivorous tomtit was feeding on the flesh of the malefactor, he had an eye to a comfortable habitation in the vicinity of so much good cheer; and as there was no hole in the gibbet post to suit his purpose, he actually took possession of the dead man's mouth, and he and his mate brought forth a brood of young cannibals; and more than that, they built there the next year, and were equally successful in rearing their young. I think I hear some of your readers say, "Come, come, Mr. Woodcock (*Scólopax rustícola*); you are now dealing in the marvellous, and are rather stretching it:" but I can assure you, Sir, it is correct, as I have had it corroborated by several eye-witnesses. — *Id.*

Pàrus màjor (*Large Tomtit*). — I have found the nests of these birds more than once beneath an inverted flower-pot. As before noticed in your Magazine, the old bird invariably covers its eggs with feathers, before leaving the nest. — *Id.*

Fishes feed and discern in sunny Weather. — By A. R. Y.'s extract (p. 58.) from the *British Naturalist*, it appears the author of that work says, "that fish do not feed, and therefore we may conclude that they do not so well discern, small bodies upon the surface, when the sun is bright." If the author had ever been a May-fly fisher, he would have known that bright weather and clear water were essentially necessary to insure his success. This fly (? Sìalis lutària) which is one of the best baits I know for large trouts, is much used by the anglers in some of the rivers in Yorkshire (perhaps in other counties also), where two different methods of fishing it are practised. The one is bobbing, which, with one sort of bait or other, is universal, and therefore needs no description; however, it is always practised in bright weather, I believe. In the other method the May-fly is fished in rapid streams with a long line, in the same way as the artificial fly, except that it is fished up the stream; that is, the angler throws his line into the stream above where he stands, and allows it to float down opposite to him, when he makes another throw: by this means he always keeps the line slack, and the May-fly floats on the surface, which is essential to his success.

I mention these two methods of fishing, because both are practised in bright weather, and therefore prove that fish both "feed and discern" on such days. I believe the fact is, that at such times they frequently see too well for the angler, and are consequently aware that his artificial flies are not what they seem to be. Fishes, particularly graylings, may be seen rising by dozens at the small midges (? Culicöìdes punctàta *Latreille*) which abound so much in sunny weather, without the angler being able to hook a single fish. The first-rate anglers are well aware of these things, and abandon their larger flies as the summer advances, use smaller hooks, dress their flies much finer, and substitute horsehair for the fishing-gut when they can procure it of good quality.

Lampreys (*Petromỳzon fluviátilis*) abound in the Ribble, some of them of the large species P. marìnus, which are caught of 3, 4, and sometimes 7 lbs. weight; but, owing to a prejudice which exists against them (I suppose on account of their ugliness), they are seldom eaten. I will illustrate this prejudice by giving you the remark of a keen fisherman to myself, on my saying that I should eat a large one I had just caught. "Well!" said he; "if you can manage to eat such a thing as that, you would not stick at devouring a child in the small-pox." This, if not an elegant, was at least a forcible, expression of his opinion on the subject; and this dislike to them is almost universal in this neighbourhood. — *T. G. Clitheroe, Lancashire, Jan.* 17. 1832.

Queries relative to the lampreys, their sex, and other particulars, will be found in Vol. III. p. 478.: they are by "An Old Angler," to whom scarcely any one seems yet to have given answer. — *J. D.*

Cýprinus Phóxinus Linnæus. — Mrs. Unwin and I, crossing a brook, saw, from the foot-bridge, somewhat at the bottom of the water which had the appearance of a flower. Observing it attentively, we found that it consisted of a circular assemblage of minnows; their heads all met in a centre, and their tails diverging at equal distances, and being elevated above their heads, gave them the appearance of a flower half blown. One was longer than the rest; and as often as a straggler came in sight, he quitted his place to pursue him, and, having driven him away, he returned to it again; no other minnow offering to take it in his absence. This we saw him do several times. The object that had attached them all was a dead minnow, which they seemed to be devouring. (*Letter to the Rev. Mr. Hurdis by Cowper*, dated Weston, Feb. 23. 1793. See Hayley's *Life of Cowper*, 4to, p. 110.)

Dead Frogs and live ones consumed by Leeches. — Strolling once in April, 1830, in company with several others, over a part of the Chiltern Hills, for the purpose of collecting plants for my herbarium, I came to a marshy spot of ground, the stench from which almost poisoned the atmosphere. Looking round, I beheld innumerable heaps of frogs and leeches in a state of decomposition; and others half dead, with leeches attached to them, apparently in the act of preying on their bodies. — *J. G. Great Marlow, Sept.*, 1831.

In the Linnet, at Bury St. Edmund's, I once saw a dead frog lying on the mud under water, and horse-leeches (*Hirùdo Sanguisùga*) were within its skin, apparently feasting with due zest on its decaying flesh; and thus animating, in a fresh form, the matter so lately endowed with life. — *J. D.*

Butterfly (*Vanéssa Atalánta*). — I enclose a specimen of the species to which the following anecdotes apply: — Sept. 15th. It fixed on a sunflower; and being engaged in extracting honey, it was so tame that at first I believed it to be blind. It flew to a considerable distance, and often returned; but whether on the sunflower or on a wall, it was so tame as to allow me to touch repeatedly its wings, antennæ, and head; stretching the antennæ, and erecting its head as my finger waved over it. It perceived a sudden threatening movement at the distance of three inches; but except discovering the flowers, it manifested no vision beyond that distance; although nearer, it showed intelligent notice of my actions. At another time, when I had thrown some decayed pears into my garden, about a dozen of these butterflies alighted on them, and began to eat. They were so tame that I took up some with my fingers; and, when my hand was placed on the pears, some alighted on it and crawled over it. I thrust them away, but they refused to fly. I do not recollect to have noticed any observation of habits such as these in any publication that I have met with. I am, Sir, yours, &c. — *Jonathan Couch. Polperro, Dec.* 21. 1830.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Retrospective Criticism.*

T. W.'s Letters descriptive of a Natural History Tour in North America. (Vol. III. p. 489., Vol. IV. p. 108. 289.) — Such vast and rapid changes take place in the New World, that it requires considerable allowance to topographical descriptions written in 1823. I do not think the writer is fortunate in his first sketch from the Hudson (Vol. III. p. 494.) I certainly took it for a view of St. Helena, to which place it bears a greater resemblance. It must be remembered that one peculiar feature in American scenery, which seldom fails to strike the observer on his first acquaintance with this country, is, that its mountains, high or low, are always completely covered with forest. It is extremely interesting to read and compare the first impressions of travellers in America; and whatever may be said to the contrary, and about hasty observations, &c., I cannot but think the earliest notes give the most lively, true, and natural picture when the impressions are fresh and new and vivid. A thousand little characteristic circumstances, which we notice at first for their novelty, are soon forgotten, or wholly unnoticed, if they are not recorded at the moment of observation; and the traveller who waits a year before he puts his notes and sentiments on paper may be somewhat more strictly authentic, as relates to the dry affair of statistics, but he is not half so entertaining as those who write on the instant. — *R. C. Taylor. Philipsburg, Centre County, Pennsylvania, W. States, August* 7. 1831.

The Journal of a Naturalist; an extraordinary Statement in it confirmed. — Sir, A few days since I was amusing myself by the perusal of the Magazine of Natural History (Vol. II. for the year 1829.), and at page 180. I met with a critique upon the above work, under the signature of K. After reviewing a few pages, the critic says (p. 180.), " At last, however, having settled the merits of the limestone rock, and the shells and flints, and happily consigned the fate and fame of strontian to the justice of time, we flatter ourselves that we have passed all obstacles to our progress towards a more pleasing part of the country, when suddenly we are requested to pause by the side of a limekiln, to give ear to a tale which requires all our powers of belief." That tale, Sir, runs thus (*Journal of a Naturalist*, new edition, 1830, p. 12.):—" Perhaps I may here mention an incident that occurred a few years past at one of our limekilns, because it manifests how perfectly insensible the human frame may be to pains and afflictions, in peculiar circumstances; and that which would be torture, if endured in general, may be experienced at other times without any sense of suffering. A travelling man, one winter's evening, laid himself down upon the platform of a limekiln, placing his foot, probably benumbed with cold, upon the heap of stones, newly put on to burn through the night. Sleep overcame him in this situation; the fire gradually rising and increasing, until it ignited the stones upon which his feet were placed. Lulled by the warmth, the man slept on. The fire increased until it burned one foot (which probably was extended over a vent-hole), and part of the leg, above the ankle, entirely off; consuming that part so effectually, that a cinder-like fragment was alone remaining; and still the wretch slept on, and in this state was found by the kilnman in the morning, insensible to any pain, and ignorant of his misfortune. He attempted to rise and pursue his journey, but missing his shoe, requested to have it found, and when he was raised, putting his burnt limb to the ground to support his body, the extremity of his leg bone (the tibia) crumbled into fragments, having been calcined into lime. Still he expressed no sense of pain, and probably experienced none, from the gradual operation of the fire, and his own torpidity, during the hours his foot was consuming. This poor drover survived his misfortunes in the hospital about a fortnight; but the fire having extended to other parts of his body, recovery was hopeless." After being somewhat facetious, K. ends by saying, "We will venture upon no further comment on this story: some things are possible that are passing strange." Now, Sir, as truth is always valuable, and the veracity of all who write upon natural history particularly so, I presume that you will, when your space serves you, feel no difficulty in the admission of this to the same channel as that wherein the incredulity appeared. The author of *The Journal of a Naturalist* is here well understood to be J. L. Knapp, Esq. F.L.S., and an honorary member of the Bristol Philosophical and Literary Institution. I have not the pleasure of his acquaintance, and am probably entirely unknown to him; but I cannot forego this opportunity of thanking him for the amusement and instruction I have received by the perusal of his interesting book. But now for his justification. By a reference to my memoranda, I learn that on the 18th of April, 1817, Thomas Martin, aged fifty, was brought to our hospital, having been burned at a limekiln. The outline of the preceding story is the same as the one related to me by the kilnman and the people who brought him to us. As Mr. Knapp's residence at Alvestone is pretty close to Tockington, on the Thornbury road, where the affair happened, it is exceedingly probable that the same persons were his informants as well as mine. As the man did not appear to be in a state of much suffering, as he did not complain of being otherwise injured, and as his clothes had no appearance of having suffered by the fire, it was not suspected that there was any thing to contend with but the leg. The parts just above the ankle being absolutely burnt to a mere cinder, exhibiting a most ghastly appearance, the limb was amputated by Mr. Lowe, the surgeon of the week; Mr. Nathaniel Smith and myself assisting at the operation. Martin died in fourteen days. I prepared the limb, and deposited it in the museum which I lately gave to the charity, considering its history to be very curious. Should you, or any friend, come to this part of the country, I shall be happy to show it, as confirmatory, so far, of my part of this "passing strange" narrative. I have only to add, that should this meet the eye of Mr. Knapp, in the pages of your journal, it will be the first intimation that my pen has been taken up in his vindication. I am, Sir, yours, &c. — *Richard Smith, senior Surgeon to the Bristol Infirmary. 38. Park Street, Oct.* 18. 1831.

Wilson, the celebrated Ornithologist. — Wilson died of the dysentery on the 23d of August, 1813, as stated by me, p. 103. This fact is attested by Wilson's friend, George Ord, in a Memoir of Wilson, from the pen of Mr. Ord, prefixed to vol. ix. of Wilson's *American Ornithology;* and in Sir William Jardine's edition of Wilson's work may be found numerous proofs that Wilson was living in the early part of 1813, and, consequently, that he did not die in 1809, as remarked by your other correspondent in p. 103. Wilson was born in 1766, not "1776," as misprinted on p. 103. — *John Parry. Manchester, January* 30. 1832.

Hares taking the Water. — So much has been said on this subject, that it becomes tiresome; or I could confirm it by the testimony of an old man here that sees it by day, and by moonlight as he lies in bed. He keeps the locks on the Ellesmere Canal, and constantly sees them voluntarily swim across and back into Aston Park. — *J. F. M. Dovaston. January* 8. 1832.

The Stoat; variation in the Colour of its Fur, according to Season. — Sir;

J. M., at p. 77., says, "The stoat (*Mu*stèla ermínea) does not change its colour here, as in the northern parts of the world." Unless J. M. means to include Yorkshire in the "northern parts of the world," which I presume he does not, allow me to say, that I possess a specimen of the stoat, which, with the exception of the black tip at the end of the tail, and a streak of brown on each cheek, is entirely white; such a change of colour in the winter is by no means uncommon in the north of Yorkshire, all the specimens I have seen in that season being more or less white. — *M. P. January* 10. 1832.

The Stoat (Mu*stèla ermínea*). — J. M. says, on p. 77., "that the stoat is more timid than the weasel, and that it does not change its colour, as in the more northern parts of the world." I know not why he calls it timid, even relatively, as I think it the most fearless wild animal we have in the kingdom; in proof of which, I will mention an incident that I witnessed myself. I one day saw a stoat carrying off a large rat it had killed, and I immediately pursued it; but it stuck so tenaciously to its prey (although it was so encumbered with its load as to be scarcely able to run at all) that I was close upon it before it would abandon it; however, it then took refuge in a wall that happened to be close by. I took up the rat, and the stoat put its head out of the wall, spitting and chattering, with every appearance of the most lively indignation against me for having so unjustly robbed it of a lawful prize. I amused myself with watching it for some time; and then, being desirous of seeing how far its evident desire to recapture its booty would overcome its fear of me, I held the rat just before the hole in which it was; when, after several attempts, in which its discretion got the better of its valour, it at length screwed up its courage to the sticking place, came boldly out of the wall, and dragged it out of my hand into its hole. I know not in what county J. M. lives, nor do I know whether he means to include any part of England in the more northern parts of the world, but I do know that it is white in the winter in Yorkshire, as I have caught, and still more frequently seen, specimens of this colour. — *T. G. Clitheroe, Lancashire, January* 17. 1832.

The Stoat (p. 77.). — In this county, Cambridgeshire, the stoat does sometimes change its coat, and assume the perfect dress of the ermine, as two fine specimens in the museum of our Philosophical Society will testify. — *J. S. Henslow. Cambridge, February* 14. 1832.

The Stoat. — Sir, If the stoat or white weasel of J. M. is not of a distinct species, his remarks on it (p. 77.) do not apply to every part of the kingdom. He says, that "it is more abundant than the weasel, probably because it is unable to enter the holes of the reptiles by which it is killed." Now, although I know many insects that dig holes for themselves, yet I know of no reptiles that do so, nor do I know of any reptile in Scotland that is in the habit of killing the white weasel or stoat (*Mu*stèla ermínea). In fact, the best of them would find him not a simple customer. The viper, doubtless, may have it in his power to bring death at the long run upon him, although this must occur very rarely. For the viper hunts for frogs and mice when they lose the power of smell, and come in his way, by day only; and indeed is rarely seen abroad but in sunshine. The stoat may sometimes be seen during the day; but from habit he is a prowler, "a minion of the moon." Here he is so much rarer than the weasel, that there are three of the latter for one of the former, especially in the cultivated districts. The stoat, or white weasel as he is called in Selkirkshire, is rather partial to a wild and mountainous country. His habitations are the holes of the mole, into which I have often tracked him during snow, and persevered to dig for him for some hours. I came at last, however, to his lodging, and I was almost sorry for it, as he had escaped by a back door, and I only dug up and uselessly destroyed his winter abode, in the furnishing of which he had shown much good sense.

The snugness and comfort of this retreat was indeed truly enviable, while the wind was sharp from the north-east, being lined with a large quantity of the down of mice and moles, and some feathers. In a side apartment there were some two or three dead mice, and a bird, lying in store. It is an extremely bold and intrepid little creature, but it is likewise very swift, and trusts more to its speed than the weasel does. I have more than once known him afford capital sport with a greyhound; for whenever the dog stoops to mouth, he jinks as quick as lightning between the dog's fore-legs, and throws him wonderfully out; and, as he is almost indefatigable, generally succeeds at last in gaining time to find a mole-hole. I shall be much gratified to hear, from any of your numerous readers, some facts showing how it was discovered that he gets killed by the adder. In the high lands around the sources of the Tweed he turns to a pure white during winter, all save the tips of his ears and the black brush upon his tail, the colours of which are always permanent. — *W. L. Selkirkshire, January* 30. 1832.

The Stoat (p. 77.). — J. M. is mistaken, in some degree, when he says, the stoat (*M*ustèla ermínea) does not change its colour here as in the northern parts of the world. I have frequently seen them quite white in winter; and a brother of mine shot one several years ago, which we got stuffed, and its colour was, I think, as pure as any foreign ermine. In summer they are frequently so dark in the coat as to be taken for a light-coloured weasel; more of a dusky yellow than white. — *Thomas Thompson. Hull, February* 16. 1832.

The Stoat and Weasel. — J. M.'s interesting account of the stoat and weasel (p. 77.) induces me to offer the following remarks: — To many the study of zoology would become more attractive, and be greatly facilitated, were the common and provincial names of animals acquired and attended to, with the same care as the Linnæan nomenclature. "In the north," says J. M., "this animal (the weasel, *M*ustèla vulgàris) is called the foumart, and often the whitret."* If he write of the north of England he may be perfectly correct; but in the north of Scotland the polecat (*M.* Putòrius) has the term foumart invariably applied to it. With all, except with such as have compared them with systematic descriptions, *M.* vulgàris and *M.* ermínea pass as individuals of the same species. Consequently, in this part of the country, the name is indiscriminately applied to each. The stoat is more frequently seen than the weasel; but J. M.'s remark is to be taken with some exceptions when he states that the former, *M.* ermínea, "does not change its colour here (in Britain does he mean?) as in the northern parts of the world." In this district it has occasionally been seen quite white, excepting the tip of the tail, which remained unchanged; and the belly, which had a yellowish tinge. It has been met with in this condition (only?) in very severe winters, and when the snow lay deep on the ground. Now, as it is frequently met with, in the winter months, with no alteration of its fur beyond what J. M. states, it would be well worth the attention of all who have the opportunity, to ascertain whether the degree of change in its fur be regulated by the severity of the winter generally, or by the severity of particular parts of this season. Does it change for the season, or with the season?

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* "*Quhittret* has been derived from Teut. *wittern*, odorare, odorem spargere [to give out an odour]; Gl. Sibb. This indeed expresses one quality of the animal, as, when pursued, it emits an offensive smell. But I would rather deduce its name from another, which would be more readily fixed on, as being peculiarly characteristic, and more generally obvious: this is the swiftness of its motion; Isl. *hwatur*, Su. G. *hwat*, quick, clever, fleet. Thus we say, *as clever's a quhittret*." — Jameson's *Scottish Dictionary*. This is a very different etymology from that suggested by J. M., p. 78.

In December, 1831, I observed an instance illustrative of the habits of the stoat (*M.* ermínea). While standing near a canal, about 14 ft. wide at the surface of the water, and at the place where it joins a river, I saw one of these creatures coming along the side of the river towards the canal. It then ran up the side of the canal, repeatedly approaching the brink, as if looking for a plank which usually lay across the canal, and which it most likely had made use of on former occasions. When it came to the spot where the plank had been, it without hesitation went into the water, and swam straight across the canal, its head and tail only appearing at the surface. After landing, and in making for a bank where some brown rats (*Mús* decumànus) lodged, it passed quite near to me, so that I saw that its fur was perfectly dry. There was nothing at the time on the opposite side of the canal to frighten this little active quadruped, or to force it into the water for safety or retreat. On the contrary, its immersion and swimming were voluntary and natural, and what it probably had often had recourse to during its excursions. — Γ. *Moray, February,* 1832.

The fact of the stoat's crossing the water spontaneously, increases the probability of the mole's doing it also, as conjectured (p. 78.) by *J. D.*

The Stoat. — Your correspondent, J. M., appears (p. 77.) not to be familiar with the natural habits of the stoat; and if its "not changing colour *here*," means Great Britain, the statement is quite erroneous. They abound in the neighbourhood where I now write, and it is equally impossible to find a brown one here at Christmas, or a white one at midsummer. The winter fur is perfectly white, excepting the lower half of the tail, which is always black. I have shot them in spring piebald with brown and white. Their powers and habits are widely different from those of the weasel, being infinitely more active in running, leaping, springing up trees and stone walls, and nightly travelling over many miles of distance beyond that of the weasel. It is, perhaps, of all other vermin, the most destructive of game, more especially in the breeding season, when it incessantly preys on young hares and broods of pheasants. I have seen in a chase of a half-grown hare by a stoat, as if the former had not the power of exerting its best speed, but continued hopping forwards very moderately, and the stoat, with an equally apparent moderation, chasing behind. Many would be induced to attribute such an occurrence to what is mistakingly called fascination in serpents, and which is nothing more than the parent birds hovering over the reptile, and, like other parent animals, endeavouring to decoy it away from their young. In the case of the hare and stoat, the natural explanation seems to be that the latter was chasing the former until it was sufficiently blown to be mastered by an animal so much less than itself, and on the part of the hare, a consciousness that it could not escape by flight, and was reserving itself for the struggle. This, however, is offered merely as a conjecture. — *J. Carr. Alnwick, Jan.* 8. 1832.

The Weasel (p. 77.). — The same correspondent's account of the weasel is, in many particulars, correct; but he commits a strange blunder in asserting that it is called a foumart in the north. Foumart is a corruption of foulmart, in opposition to sweetmart, a tree animal, very similar in form and colour, but longer; and the three animals, weasel, stoat, and foumart, are as well and as distinctly known here as sheep, cattle, and horses. I also very much doubt its "depredations on the chickens in the poultry yard." In every such case the stoat, I believe, is the real and most destructive depredator, and, indeed, is very generally amongst country people called a weasel. [In Cambridgeshire the true weasel is deemed destructive to poultry, and destroyed, when practicable, accordingly. — *J. D.*] The latter (the weasel), in truth, is a most inoffensive creature; and if it ever does injury to any one, it weighs as dust in the balance against its benefits. In a stack yard abounding with mice, the loss sustained is often enormous, and, indeed, incredible to all who have not witnessed it; and there a couple of weasels will do more good than twenty cats. [This is admitted in Cambridgeshire, although it is there accused of destroying the poultry as well. — *J. D.*] A mouse can enter nowhere into a corn stack, but where a weasel can pursue and destroy it, and I have seen the whole interior of such a stack strewed with the fragments of destroyed mice. All the bad character of the weasel arises from confounding it with the stoat, which well merits destruction wherever it can be met with; but as to the innocent and most useful weasel, the brood ought to be protected, and its residence in the farm yard encouraged by every means. The black tail of the stoat is a certain and constant distinction from the weasel. The white rat, mentioned by J. M. (p. 78.), is evidently nothing more than the winter stoat, which, in that garb, is frequently seen about buildings and drains. Natural history has long been overlaid with obscurity, by misapplied names and false references; and much remains to correct in that way, and much of instructive information to be drawn from enquiries into the natural habitudes and varied modes of existence of the several species, instead, as at present, making it a meagre detail of personal descriptions. — *J. Carr. Alnwick, Jan.* 8. 1832.

The Weasel (p. 77.). — Sir, J. M. says of the weasel, "In the north this animal is called the foumart, and sometimes whitret, as if white rat." The name whitret is entirely a new name to me; but the foumart of the north of England most decidedly is not the weasel, or the *M*ustèla vulgàris, but the polecat, or *M*ustèla Putòrius of Linnæus; which, from the strong smell it emits, when frightened, is called the foumart, quasi foul marten, whilst the pine marten (*M*ustèla abiétina), which is a very scarce animal, at least in the north of Yorkshire, is called the sweet marten, in contradistinction to the foumart. This, Sir, is one of those instances which shows the necessity of familiarising ourselves with the scientific names of animals; for otherwise you perceive it might be possible for two persons talking of the foumart to be mutually misunderstanding the animal meant by the other. The foumart of Yorkshire is the same animal which yields the fur, which, when imported from abroad, is called fitch. — *Thomas Thompson. Hull, February* 16. 1832.

Of the Weasel (*Mustèla vulgàris*). — J. M. says (p. 77.) that the weasel is called foumart in the north. This is not the case in this neighbourhood certainly; here the polecat (*M*ustèla Putòrius) is called foumart (as if foul-mart); in contradistinction to the marten * (*M. foina*), which is called sweet-mart. — *T. G. Clitheroe, Lancashire, January* 17. 1832.

Weasel (*Mustèla vulgàris*). — J. M. remarks (p. 77.) that in the north the weasel is called foumart; in Yorkshire, I believe, this name is exclusively applied to the polecat (*M.* Putòrius). I know not whether the fulimart of old Izaak Walton be the foumart or not; it is, however, evidently not the polecat. See Sir J. Hawkins's note on p. 88. of *Walton's Angler*. Yours, &c. — *M. P. January* 10.

The Polecat (*M.* Putòrius *L.*) is several times alluded to above. Remarks descriptive of its manners and habits, and a figure of its skull, occur in Vol. IV. p. 10.; all adduced by Dr. Farrar, in relevance of his speculations on the consonance of the anatomical structure of the ear of the polecat with the animal's habits of life. — *J. D.*

Auditory Organs of the Hedgehog, Mole, and Water Shrew.— Sir, Dr. Farrar (Vol. IV. p. 13.) was undoubtedly wrong in supposing that our common hedgehog (*E*rinàceus europæ'us) has no external auditory tube; but the cause of his error is easily explained. C. S. E. (Vol. IV. p. 382.) brings forward a much more unaccountable conclusion, when he contradicts Dr.

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* Marten, a species of weasel; martin, a species of swallow. (*Walker's Dictionary*.) A transposed application has hitherto occurred. — *J. D.*

Farrar, and says that he found the external ear of the hedgehog "terminating inferiorly in an open external auditory aperture." I believe that such is never the case, but that, owing to a peculiarity in the relations of the tragus and antitragus cartilages, and a singular structure of the helix, it is always apparently closed, although it is not so in reality. On being accurately examined, those cartilages will be found approaching very nearly to each other, so that the interval between them is but a small cleft scarcely observable; and they are surmounted by a kind of valve, which is a very extraordinary developement of the internal point of the helix, and which closes that cleft completely, causing the ear to appear as if it really had no opening leading to the membrane of the tympanum. How C. S. E. could overlook this circumstance I cannot conceive. It is very probable that the animal can voluntarily raise or depress its valvular-like helix, so there is no doubt but that it possesses the sense of hearing; for, with the exception of the above peculiarity, its auditory structure, internal and external, resembles that of mammiferous animals generally: it contains every organ essential to the perfection of that faculty. If, as Dr. Farrar supposed, it had no external auditory passage, that would not, as he concluded, warrant us in supposing that its ear was of no use to it; for there is

The Common Mole (*T*àlpa europæ`a), and others might be mentioned, whose external ear is wanting, yet its internal ear is remarkably developed, and it is certain that its hearing is very acute. This is a beautiful provision of nature, which I cannot avoid noticing. The mole always leading a subterraneous life; if it had external ears, they would be a continual source of annoyance to it, by their becoming filled with dirt, stones, &c. How sounds are conveyed to this animal's tympanum, is a query not at all satisfactorily explained. But in applying the principle of the adaptation of means to ends, so admirably exemplified throughout all nature, particularly in the organisation of animals, we come to an enigma which we cannot solve, when we enquire for what purpose the forementioned singular provision should be conferred upon our common hedeghog. It must, however, probably effect some important design hitherto undiscovered. No other species of hedgehog has any provision of the kind, although one, the *E*rinàceus aurìtus, which inhabits the eastern regions of Asiatic Russia, very closely resembles its European congener in all other respects, in manners, habits, and general conformation, excepting the great length of its external ears; whence is derived the specific appellation aurìtus. Nor am I aware of but one other animal, in the whole of the extensive order *Carnassiers* [carnivorous animals] of Cuvier, having its ear closed in a similar manner, and that is

The Water Shrew (S*òrex fòdiens of Linnæus*). When this animal plunges into the water, where it is said to spend a great part of its time, its ear is almost hermetically sealed; not however quite in the same way as the hedgehog's ear is closed, but by means of three small valves, corresponding with the helix, the tragus, and antitragus. The design in this instance is obvious, to prevent the water from permeating into the external auditory tube; by which it would not only be very painful to the animal's feelings, but must eventually destroy its power of hearing. The similar provision with which the hedgehog is endowed fulfils probably some equally important end, if it be true, as I firmly believe it is, that "the parts of animals have all of them a real, and, with very few exceptions, all of them a known and intelligible subserviency to the use of the animal." The hedgehog, however, presents us with one of those "exceptions." I am, Sir, yours, &c. — *J. J. Gelly, Montgomeryshire, August*, 1831.

Those desirous of tracing the history of the water shrew farther are referred to p. 79., and to the preceding notices there indicated. — *J. D.*

The Rallus Créx, or Corncrake. — This bird has a strong muscular gizzard, notwithstanding the doubt expressed by A. R. Y. (p. 68.) in his excellent review of the *British Naturalist.* By means of its gizzard this bird can triturate shells, and elytra of beetles and their hard bodies. I once saw a cook-maid take out of the gizzard of one a shell-snail whole (*Hèlix* nemoràlis), and its gut was full of the bodies of *T*ípula pectinicórnis (Harry long-legs). — *J. F. M. Dovaston. January* 8. 1832.

The Water Rail (*Rállus aquáticus*, p. 68.). — In reference to its food, I must say I have found its crop filled with the seeds of bog plants. — *T. K. Dublin, Feb.* 7. 1832.

Turtle Doves. — J. M.'s remarks on turtle doves (p. 82, 83.) are genuine and judicious. We have turtle doves here in abundance, in their season, and the people call them Wrekin doves, ignorantly imagining that they come from, and retire to, that mountain. — *J. F. M. Dovaston. Westfelton, near Shrewsbury, January* 8. 1832.

Food of the Chaffinch (Fring*i*lla Sp*i*za Ren.). — There must be some mistake in the statement (Vol. IV. p. 417.) that the chaffinch is, "during summer, entirely insectivorous;" for though I believe it feeds its young almost wholly on insects, the old birds uniformly prefer vegetable food. In the early summer they accordingly look out for the more early seeds, such as those of *D*ràba vérna, groundsel, chickweed, and the speedwells, and even eat the leaves and young shoots when they cannot procure seeds. Their being prolific breeders, and requiring, of course, an extensive supply of insects for their young, may have led to the mistake. I once reared a young chaffinch from the nest, and previous to its first moult it eagerly devoured flies and other insects; but afterwards, though it retained the habit of snapping at every fly that came near it, and even of killing them, it always dropped them in the cage. I never observed it, indeed, after this period to swallow any insect. — *J. Rennie. Lee, Kent, Jan.* 7. 1832.

The chaffinch is execrated by most gardeners, and not without cause. In early spring it does ruinous injury to his hopeful crops of sprouting seeds of radishes, of hawthorn, and of other plants. This does not invalidate Mr. Main's remark above cited, that the chaffinch is "entirely insectivorous in summer;" it is not, however, entirely so in autumn; then it vindicates most diligently, and pertinaciously too, and to an expensive extent, its claim to a share of the crops of ripening seeds of radish, cabbage, and other plants; especially those in the natural order Crucíferæ. — *J. D.*

Since these remarks were written, A. R. Y. has presented the reader (p. 65.) with a confirmation of this accusation, and also exhibited several instances of benefit conferred on man by the chaffinch. — *J. D.*

The Term Midge as applied to a Species of Fish. — Sir, In Couch's very excellent and interesting paper on the Fishes of Cornwall (p. 15.) I would decidedly object to the term Midge; for, as this term has been previously applied to an insect, the Culicöides punctàta of Latreille, its application also to a fish tends to confusion. Yours, &c. — *J. Rennie. Lee, Kent, January* 7. 1832.

Mr. Couch seems to have anticipated, but still has not met, this objection. He remarks (see p. 16.), "I find also the word midge used for a gnat in Hawkins's edition of *Walton's Angler*, part ii. p. 104." See also p. 290.

Use formerly made of the common Viper. — Sir, From the remarks made by your valuable correspondent W. T. Bree (Vol. IV. p. 472.), on the use made of the common viper, I am induced to send you the following, copied *verbatim* from an old *London Dispensatory*, by William Salmon, Professor of Physick. 1702: — "*Vipera* (*echis*, Greek; *shephiphon*, Heb.), *the Viper.* — It is a serpent that brings forth alive, exceeding other serpents in venom; sleeping all winter under the earth, or in rocks. Schroder saith, he opened a great serpent in Finland, which had living young within it; but I rather believe him to be mistaken, and that it might be an overgrown viper of a strange colour; for, to our knowledge, serpents lay eggs, and we opened two which had more than a dozen eggs apiece within them: so that it stands against reason that one and the same kind should bring forth both ways. The young females are the best, being taken in the spring after they have been awhile out of their dens. Vipers have all the same virtues with serpents, save only vipers are stronger, and they have also the same preparations. In the viper there is nothing venomous but the head and gall; the flesh, liver, and bones have no poyson in them. 1. The head of the viper is used as an amulet, to be hung about the neck, to cure a quinsie. 2. The flesh is hot and dry, and purges the whole body by sweat; and, being eaten or drunk, it cures the French disease and the leprosie. 3. The broth of them performs the same things; eating half a viper at once, and fasting five or six hours after it; so also they cure old ulcers and fistulas, clear the eyesight, help the palsie, and strengthen the nerves. 4. The ashes of their heads, mixt with a thick decoction of bitter lupins, and used as an ointment to the temples, stops rheums falling into the eyes, and helps their dimness; and is an excellent thing against St. Anthonie's fire. 5. The fat or grease mixed with honey is an excellent thing to clear the sight. 6. The whole viper, in pouder (the head and gall excepted), cures perfectly the gout, king's evil, taken twice a day to ʒij. or more. 7. Oleum viperarum. ℞ Black vipers, ℔iij.; oil of jessamine, ℔ij.; boil them in a close glass till the flesh falls from the bones; or you may make an oil of them by dessension. It cures the gout, palsie, and leprosies; cleanses the skin, and helps all the defects thereof. 8. Viper wine. It is made by drowning live vipers in the wine: it cures leprosies and the French disease. 9. Powder of vipers compound. It is made as that of serpents, and has all the same virtues. 10. Quintessence of vipers. It is made as we have taught in our *Dor. Med.*, lib. ii. cap. 8. sect. 2., and is very powerful against leprosies, the French disease, and all impurities of the flesh and blood. 11. Essentia viperarum. ℞ Of the livers and hearts of vipers, ana; dry and bruise them, and extract a tincture in seven days with s. v. rectified: To ℔i. of this tincture add of the fixed salt ℥ss. mixed with the flegm and spirit of vipers; draw off by distillation; of the volatile salt ℥i.; digest till they are united: so that you have a most ennobled essence of vipers, powerful to all the aforesaid intentions. Dose ad ℈ij. It is a most excellent medicine, dissolves all excrements and coagulations of tumours; dissolving, purifying, and cleansing like soap; carrying out every ill by urine, sweat, or intense transpiration; curing all sorts of gouts, the stone in both reins, and black leprosie, French disease, scurvy, melancholy, all obstructions and putrefaction, loss of strength, decays of nature, and consumptions: so that, as it were, it even renovates a man, by taking away what is contrary to nature, and adding what is requisite. 12. Spirit of oil volatile and fixed salt of vipers. ℞ Dryed vipers with the liver and heart; cut and gently bruise them; put them into a retort, from which distil *gradatim* into a large receiver: so have you a flegm and spirit, and then a volatile salt, sticking to the neck of the retort and sides of the receiver; and at the last a thick stinking oil, which separate. Purify the volatile salt in a long glass, and sublime it by an alembick in sand, with a gentle fire, lest any humidity should follow, as is usual if the fire be increased. This salt is wonderful piercing and volatile, and therefore ought to be kept close in a glass, with a glass stopper: from the *caput mortuum* you may make a fixed salt the common way. The volatile salt and spirit are wonderful medicines: they resist putrefaction, open all obstructions, cure quartans and all sorts of fevers; given an hour before the fit, in a convenient vehicle, to allay the sharpness, as in the emulsion of almonds, with a little rose and cinnamon water and white sugar. Dose of the volatile salt is, à gr. vi. ad x. or xii.; of the fixed, à ℈ss. ad ℈j. or ʒss. The biting of the vipers is mortal, and kills within three days at farthest if not speedily cured: the poyson is universal, as if the body was set on fire, with convulsions, cold sweats, vomiting, and then death. At first, the poyson may be sucked out by applying the anus of a hen to the part after scarification; or else a plaster of garlick, onions, and Venice treacle; drinking French wine, garlick broth, and taking mithridate, bezoar mineral, and myrrh, &c."

It will be hence seen the high estimation our forefathers had of the use of the viper, and the mode of making some of its various preparations; and the great confidence they placed in its virtues in eradicating those now unknown diseases (or, perhaps, better known by more intelligible names). But thanks to the march of intellect, and the persevering researches of our modern physicians, for the erasement of this and numerous other noisome remedies from their present mode of practice. I am, Sir, yours, &c. — *D. N. Worksop, Sept.*, 1831.

Parasites (Microgáster glomerátus) upon the Cabbage Caterpillars. — The calculation of Mr. Bree (p. 107.) upon the wonderful destruction of the caterpillars effected by these little creatures (what between the sparrows and the microgasters, the caterpillars seem to have a sad life of it), the announcement of J. D., p. 109. (I have observed some curious facts confirming J. D.'s statement), that the perfect flies have not a determinate time for appearing, and the statement of my friend Newman (p. 109.), respecting the structure of the larva, are very interesting. I cannot, however, bring myself to concur in the supposition of the latter gentleman, that the parasitic larvæ derive their nourishment through the long, transparent, hair-like appendage to the end of the abdomen, first observed by him; and for this simple reason, namely, that the larvæ of the *I*chneumónidæ are furnished with the same organs of nutrition as are possessed by all the other hymenopterous worm-like larvæ. It is true that these organs are very minute; they have not, however, escaped the delineator of your figure 40 *b*, p. 108., although he has mistaken them for the tail instead of the mouth of the grub. May not the appendage mentioned by Mr. Newman have been one of the skins of the larva not entirely cast off? His observation, that they entirely divested themselves of it before forming their cocoons, confirms my supposition. In answer to Mr. Bree's questions, at the foot of p. 106., I should imagine, from what I have seen of these parasites, that each species is attached to its peculiar caterpillar; hence I do not agree with Mr. Newman in thinking that the Microgáster which attacks the garden tiger moth (A'rctia Càja) is the same species as that which preys upon caterpillars of the cabbage butterfly (Pónti*a* brássicæ): the question, however, requires close investigation. I will say nothing at present upon the "relation of affinity, as the *cant term* expresses it," which Mr. Newman considers may be established by this discovery between Stýlops and Microgáster. — *J. O. Westwood. January* 28. 1832.

Humming in the Air. (p. 110.) — I would refer O. to Mr. Rennie's *Insect Miscellanies*, p. 89., and if he has not that work, I recommend him to procure it as soon as possible; in the mean time I extract the following, which I think will explain the "humming" to him. After quoting the passage in White's *Miscellaneous Observations*, referred to by O., Mr. Rennie proceeds: — "We have frequently observed this humming in the neighbourhood of London, and for some time were as much puzzled to explain it as White, till we, on several occasions, remarked a troop of swallows hawking high overhead, where the humming was heard; there could be no doubt, therefore, that it was occasioned by insects invisible to us, on account of their distance." Mr. Knapp says thus, "that this sound proceeds from a collection of winged insects, or bees, there can be no doubt." Kirby and Spence (*Introd. to Ent.* ii. 377.) seem inclined to refer it to insects of the order Coleóptera. — *M. P. Jan.* 12. 1832.

Humming in the Air (p. 110.). — As corroborating O.'s conjecture, I would refer you to an account transmitted to you last year by Mr. Jenyns, of an extraordinary swarm of minute flies, which settled in the Lodge of

King's College. Although they were exceedingly minute, yet, upon our listening with very moderate attention, their aggregate humming was very distinctly audible. The explanation of this phenomenon, mentioned by White, seems to me to be satisfactorily given by O. (p. 110.).—*J. S. Henslow. Cambridge, Feb.* 14. 1832.

We here insert the account supplied by the Rev. L. Jenyns, adverted to above by Professor Henslow.

An extraordinary Swarm of Flies. — During the month of September last, a small dipterous insect, belonging to Meigen's genus Chlòrops, and nearly allied to, if not identical with, his C. læ'ta, appeared suddenly, in such immense quantities, in one of the upper rooms of the Provost's Lodge, in King's College, Cambridge, as to render the fact worthy of being recorded. The same species of fly, or one closely approaching to it, is not uncommon in most houses, at least in Cambridgeshire, towards the decline of the summer; but in this instance their numbers were so great, and their appearance so sudden, as to surpass any thing of the kind I had ever before witnessed. It was not till after a fortnight had elapsed from the time in which these insects were first noticed that I had an opportunity of seeing them myself, during which interval their numbers had been greatly thinned by fumigations of tobacco and other substances employed as a means of destroying them; nevertheless, they were still in immense profusion, and my informant told me that in the first instance the greater part of the ceiling, towards the window of the room, was so thickly covered as not to be visible. The exact day of the month on which these insects first showed themselves was not noticed, but, as far as could be remembered, it was about the 17th of September. They appear to have entered the room very early in the morning, by a window looking due north, which had been open during a part of the night, being first observed between eight and nine A.M. A few were noticed in the adjacent rooms facing the same way, although, comparatively speaking, in no great quantity; perhaps in consequence of the windows of those rooms not being opened at quite so early an hour. None at all, however, had been seen in the house previously to that day. We are, at present, so ignorant of the habits and economy of the minuter tribes of insects, that it is not easy to speculate upon the origin of those under consideration. The enquiry which seems most naturally to suggest itself is, whether in the present instance they were all bred in the immediate neighbourhood, and at the same time, or whether they were swarms that had collected from different quarters for the purpose of migration. Many facts are on record which seem to confirm the idea that insects do occasionally change their quarters in immense bodies; and some have occurred to myself, which, I have no doubt, were connected with such a circumstance, not only from the large numbers of the insects observed, but from the steadiness of their flight, and their continually persevering in one given direction. It is worth noticing, with respect to the case before us, that King's Lodge is situate close to the river Cam, which at that place runs nearly due north and south, and it is just possible that this circumstance may have had some influence in directing the movements of these insects. I find also, by referring to a journal of the weather, kept in the neighbourhood of Cambridge, that about the time when they were first observed, the wind was N.N.W. and that it had continued fixed in that quarter for four successive days. — *L. Jenyns. Nov.* 28. 1831.

Luminousness of the Sea. — The failure of Mr. Sharpe in detecting these luminous animalcula, as noticed in Vol. IV. p. 506., arises, I conceive, from that gentleman's not being aware of the fact of their being found, when quiescent, *only* on the marginal surface of the water. I am, in some measure, confirmed in this opinion, by a similar failure on the part of an intelligent naturalist of my acquaintance. The truth is, that being simply vesicles, or air-bags, like bubbles they rise to the highest part of the surface, which we uniformly find the latter do in a glass of ale or other liquor. I find that the animalcula first figured (fig. 52. *a*) in my notice respecting the luminousness of the sea, in your Vol. IV. p. 285., is engraved in the tab. v. of Oken's *Zoology* from Slabber's Medùsa marìna, tab. viii., fig. 4. and 5. It is named by Oken, Slabbèr*ia*, and the habitat given is the North Sea. — *Samuel Woodward. Norwich, Jan.* 19. 1832.

Anchor Frosts. — Sir, J. M., in his remarks on this subject (p. 91.), appears to me to have fallen into several errors in his endeavour to account for anchor frosts (they are called bottom frosts in Yorkshire). For, admitting that main springs are of the temperature stated (40°), I am by no means prepared to believe that they keep that temperature long, or that the water issuing from them does not mingle intimately and immediately with the water of the river into which it flows; especially in the situations where anchor frosts are most common, and which are rough and rapid streams. From J. M.'s statement, it would appear that globules of water of different temperatures mix together without the one imparting its excess of caloric to the other, which is contrary to the experience of every one; it is true that in still places there will be different temperatures in the same body of water, but it is not owing to the main springs of which J. M. speaks, but to the peculiar way in which it is affected by cold. It is well known that water increases in density down to 40°, at which temperature in begins to expand, and this increase of volume continues to take place until it reaches the freezing point, so that in severe frosts there will be strata of different temperatures from 32° to 40°. Again, he says that "the crystals of ice are intercepted by the interstices of the stones, and then become heaped together in thick beds;" but, if my observations are correct, these depositions always begin first round the large stones, which are not likely to stop small spicula any more than are the water-gates of mills, where, he says, the accumulations also take place.

Anchor frosts are most common in the rapid streams occurring below deeps in rivers; and I have seen a wear on the river Wharfe (Yorkshire), which had a wall of ice 4 ft. high, formed upon it in a single night, by a sharp north wind. In my opinion a sufficient reason for these frosts is to be found in the fact, that water, when kept from agitation, may be cooled down below the freezing point without being congealed; but if the vessel in which it is kept be shaken, a portion of it is converted into a porous spongy ice, like that formed by anchor frosts, and the temperature immediately rises to 32°. In the deeps of rivers the same cooling below the freezing point takes place without congelation, but as soon as this water reaches the stream below, the agitation immediately converts a portion of it into ice, which collects round the large stones at the bottom, in the same way that crystallisation commences in a solution of salt or sugar, around a piece of thread, or other substance, which may be suspended in it. If a severe frost is followed by a bright day, thousands of these detached pieces of spongy ice may be seen rising from stones which have served as nuclei for them; which proves that the detention of them at the bottom is not merely mechanical, but that precipitation (if I may be allowed to call it so) takes place in the first instance, the stone serving as a nucleus, and that this adhesion is destroyed by the action of the sun's rays.

I have never seen any attempt to explain the phenomenon of bottom frosts before this of J. M.'s, and I am not philosopher enough to speak positively on the subject; but the above is the way in which I have always endeavoured to account for it. Perhaps some of your scientific readers may be able to give much better reasons for it than have been offered either by J. M. or myself. I am, Sir, yours, &c. — *T. G. Clitheroe, Lancashire, Jan.* 17. 1832.

London Fogs. — Fogs happen every where, caused by the upper region of the atmosphere being colder than the lower, by which the ascent of aqueous vapour is checked, and kept arrested near the surface of the earth. But fogs are more dense about London, and probably all other great cities, than elsewhere: the reason is, because the vast quantity of fuliginous matter floating over such places mingles with the vapour, and renders the whole so thick that a noonday darkness is sometimes produced, rendering candles and gas-lights necessary for the transaction of the ordinary business of the shops and public offices. Such circumstances happen frequently during winter; but on some occasions (as about 2 P.M. on the 27th Dec., 1831) this foggy darkness was truly awful. This extraordinary appearance is, however, caused by a very ordinary accident, viz. a change of wind; and which may be accounted for as follows: — The west wind carries the smoke of the city to the eastward in a long train, extending to the distance of twenty or thirty miles; as may be seen in a clear day, by any person on an eminence five or six miles from the city, and looking across the direction of the wind; say from Harrow on the Hill, for instance. In this case, suppose the wind to change suddenly to the east, the great body of smoke will be brought back in an accumulated mass, and as this repasses the city, augmented by the clouds of smoke from every fire therein, it causes the murky darkness alluded to. This effect of the smoke's being thrown back on its source may be easily conceived; indeed, it may be seen under favourable circumstances, first reverted, and gradually accumulating, till it is dispersed on the opposite side; but wherever the accumulation is, in its progress backward, there will be an unusual degree of darkness. It is to be observed, that the cause of fogs is also the cause of the smoke floating near the earth; of course, where there is much of the latter the former is doubly dense. Besides fogs, we have also mists or haze, usually accompanying east winds, especially in the spring months. In the counties to the westward of the metropolis this mist is called London smoke; but, as it is seen to the eastward as well as westward of the city at the same time, the appellation is improper. It is observed mostly under a cloudless sun, in consequence of its reflecting the blue rays of light, or perhaps the azure tinge of the sky; hence it is also called a blue mist. So imposing is this in real landscape, that the painter embodies it on the canvass. Aerial perspective cannot well be given without an imitation of this haze, and which constitutes one of the greatest excellencies of pictorial execution. Very differently is this appearance estimated by many orchardists: they call it a blight, and consequently deprecate the east wind. It is perfectly true that tender vegetation suffers under the withering effect of easterly winds, and the hot sun at that season brings forth myriads of aphides and other insects, from ova previously laid on the trees; but that they are brought by the east wind is as ridiculous as untrue. The most rational idea we can form of this hazy appearance is, its being caused by the constitutional coldness of the east wind, which, checking the ascent of vapour raised by the sun, carries it horizontally along the lowest stratum of the air, hence its visibility. A lurid gloom is sometimes produced by clouds of snow; when the water floating in the air becomes frozen into spicula, and, congregating into flakes, contrary currents of wind wheel them into irregular masses, which obstruct the light from the sky, so as to wrap every object immediately below in deep yellow light. This circumstance almost always precedes, and is a certain sign of, a fall of snow. — *J. M. Jan.* 14. 1832.

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ORIGINAL COMMUNICATIONS.

Art. I. *The Habits and Manners of the female Borneo Orang-Utan (Símia Sátyrus), and the male Chimpanzee (Símia Troglódytes), as observed during their Exhibition at the Egyptian Hall, in* 1831. By Mr. J. E. Warwick.

Sir,

The great interest and curiosity excited by the recent exhibition of the Chimpanzee and the Borneo orang-utan; and a suggestion which has been made to me, that the opportunity I possessed of being constantly with them should be made productive of some result, have induced me to mark and note down the manners and dispositions of these interesting specimens of the animal kingdom; and I now submit the following, in the hope that it may be acceptable to many of your readers, very few of whom probably have ever seen the animals whose singular habits I am here attempting to describe.

On the first sight of the two specimens, the difference was so remarkable as almost to excite a doubt whether they belonged to the same genus. The most striking points of distinction were the length of the facial angle in the female, or Borneo orang (*Símia Sátyrus*); the singular smallness of the ear, and its close resemblance to that of the human species; the pear-shaped head; the nose but in a slight degree elevated; the nostrils narrow and oblique; the extreme length of the arms, the use made of them in walking, the animal resting the hands on the ground, and swinging as if on crutches; the hair of a reddish brown, very short, and but slightly scattered over the body; the abdomen exceedingly protuberant; the feet long, with the largest toe peculiarly short, but exhibiting a perfect nail: these were the striking peculiarities on the first sight of the female; while the Chimpanzee (*Simia Troglódytes*) exhibited a marked contrast in the general character of its form, presenting a much nearer approach to that of the human race. Its conformation comprises all those points of resemblance which characterise the orang-utan, besides other instances of approximation which in that animal are not observable. The form of the head, the intellectual superiority that distinguishes the cast of the features; the proportionate length of arm to that of the body; the larger and perfect thumb; the roundness of the thigh; the perfect feet, and the consequent upright mode of walking; the complete formation of the last joint of the great toe; the quality of the sounds which it occasionally utters; — all these are points which at once strike the observer, denoting the superiority of the Chimpanzee over the Borneo orang-utan, as well as the widely different characters that distinguish them.

I must here confess myself unable to give you a scientific description of the animal: it is simply my intention to detail some of those peculiarities and habits, which few but myself have had an opportunity of observing.

On the occasion of their introduction to each other, it was curious to notice in what way they would act; not having seen any of their class for many months, and being so distinct in character, and natives of different quarters of the globe. On their being placed on the floor together in a private apartment, they stood at some distance from each other, resting on their knuckles, in evident contemplation of the new form they now saw for the first time. They then approached nearer, smelling each other very sensibly; the female protruded her prominent lower lip, touching the lip of the male, but without any smack or noise. This was done apparently without any expression of joy or mutual attachment, but merely as an act of recognition of two of the same tribe meeting in a foreign land; nor was I ever afterwards able to discover the least sign of tenderness or attachment to each other; but, on the contrary, a decided inclination to keep aloof, especially on the part of the female, whose timidity allowed the male to take from her hands any dainty that might have been given to her, with great reluctance on her part, but with evident fear of repelling the insult. On the experiment being tried of forcing them to sleep in the same cage, a battle took place, of which it was not afterwards deemed advisable to risk a repetition.

The companionable and sociable habits of the Chimpanzee far exceeded those of the female, as did his knowledge of persons whom he was in the habit of seeing. On first approaching him on a morning, or after being absent from him a short time, he would utter a loud cry of recognition; and, running towards you, would stand perfectly erect, spreading his arms to be taken up, when he would put them round your neck in the manner of the fondest embrace; nor was it an easy task, for those to whom he was attached, to leave the room, except by stealth. Food, on the other hand, was the only object that would cause any attachment, or even locomotion, in the female; of whom it might be said, that her appetite was the mainspring of all her actions, to which a protuberance and rotundity bore ample testimony. In feeding, the greediness of the female was evinced by her laying her body over the dish, securing the choicest morsels both with hands and feet, and then feeding with her mouth in the dish, using her lips in the manner of the horse, and evincing the greatest fear lest any portion should be taken from her; while the Chimpanzee sat perfectly upright, taking small portions gracefully between his thumb and forefinger, in the most placid and gentle manner; nor was his rage ever excited except by refusing him a part of an orange, of which he might have caught a glimpse, or that he knew (which he evidently did, by the smell) was contained in your pocket. Neither of these animals ever secured portions of food in the cheek or pouch; nor did they appear to smell their food before eating, as most of the monkeys do, except it was some uncommon substance which they had not been accustomed to eat. Both were in the habit of using a glass in drinking, but they were never known to throw it down; they invariably either gave it back, or set it down in the most careful manner. The Chimpanzee, in particular, was attracted by the brilliancy of colours, always getting up on the approach of any female whose dress was distinguished by the gaiety of its hues.

He likewise evinced great joy in being placed at a window, and would utter a scream of delight at the passing of horses and carriages; but nothing could exceed his rage when placed in a confined cage. He would then stand erect, crying, and shaking the bars with all his strength, until he obtained his release, when he would immediately fly to the arms of his liberator; and, such was his love of the society of those he knew, that the temptation of the choicest fruits would not entice him to remain in the room alone; for, if at liberty, he would run towards the door, and try to get out first, or would embrace your knees, and cry in the most piteous manner to be taken with you. During the whole time they were together, I never knew them attempt the least gambol or amusement of any kind, either together or individually; nor did they take any notice of other animals, as cats, monkeys, squirrels, &c., that were placed with them; but would sit for hours with the utmost gravity, as if absorbed in the most intense thought. At other times the male would examine your person, pockets, and hands, with the most minute attention. Confinement seemed to be the most dreaded punishment; and, when threatened with that, he would cling to any one present for protection; and, at night, actual force was required to confine him to his bed, the female generally retiring of her own accord many hours before him. When called to by name (Buck), he generally answered with a short cry, putting out his hands to be taken up.

The instinct of providing and placing warm materials for her bed was the most marked in the female, who would be engaged for two hours at a time in dragging blankets from various parts of the room, smoothing and changing their position, and beating any raised part down with her knuckles; assuming at the same time a look of gravity and an appearance of wisdom. This capacity of providing and preparing a nightly lodging seemed to be almost extinct in the Chimpanzee, possibly from his *sociality* and confidence in man, as he took no care in this particular; but if no place were provided for him, and, even when provided, if he did not like it, he would climb into the bed of his keeper. The timidity of both animals was remarkable, they being exceedingly alarmed even at inanimate objects; a toy-dog, or a cast of one of their own species, that was in the room, if removed the least towards them, was sufficient to drive them to the farthest extremity of the apartment, in *their* most nimble, though not very quick, pace; and the fear exhibited by the female, at the sight of her deadly enemy, a boa constrictor, was most acutely evinced. It would appear as if they had not the power of distinguishing between the real and artificial, as a toy-snake shown to her produced the same results.

The hearing of both animals was remarkably acute, catching the most indistinct noise at a considerable distance; and their knowledge of sounds was accurately shown; as, on hearing the footsteps, on the stairs, of persons with whom they were acquainted, they ran towards the door before it was opened.

They were in the daily habit of riding in a coach, and on being seated, before the vehicle moved, they would secure themselves by getting a firm grasp of the hold-straps attached to the side of the coach.

It would seem that they had some knowledge of time; for, as the hour approached at which they were removed to their nightly residence, they would of their own accord get the blankets, and enfold themselves, in readiness to depart; and if their removal were protracted beyond the usual time, it required force to prevent them from going to the door. The Chimpanzee having caught a cold, which ultimately caused his death, he had a violent cough, that in sound was remarkably human; and as, when a fit of coughing came on, he was usually given some sweetmeat or cordial to stop it, he soon adopted the cough as a mode of obtaining those additional luxuries.

Nothing more evinced the impression which the appearance of the two animals made upon the persons who saw them, than the exclamation that usually followed the first sight of them. The universal cry, on seeing the Chimpanzee, was, " What a nice little fellow !" or, " What a little darling !" while his less-favoured partner, although of the softer sex, was generally saluted with, " What a disgusting beast !" &c. During his illness, his pitiable looks and evident sufferings, with his placidity and gentle habits, endeared him to all who saw him: and when he could no longer swallow food, the quiet manner of putting the hand that offered it on one side, and uttering a peculiarly mournful cry, was painfully touching. When bled, he evinced not the least alarm or uneasiness, but put out his forefinger to touch the blood that was trickling from his arm; he even allowed a blister on the chest to remain, after having been scolded once or twice for attempting to remove it.

Without placing entire credence, then, in the many wonderful tales related of these animals, enough has surely been said to excite our curiosity and interest, and even to awaken our admiration. I am, Sir, yours, &c.

J. Warwick.

Surrey Zoological Gardens, March 23. 1832.

Art. II. *A Notice of the Reed Warbler* (*Currùca arundinàcea* Brisson). By J. G. Stoke Newington.

Sir,

This bird, although rather local, is yet very abundant in some districts. Bewick seems to have quite overlooked it, and on this ground I am anxious that the accompanying specimens and their nests (*fig.* 63.) may be figured in your Magazine. They were procured this summer [1831] at Sudbury, Suffolk,

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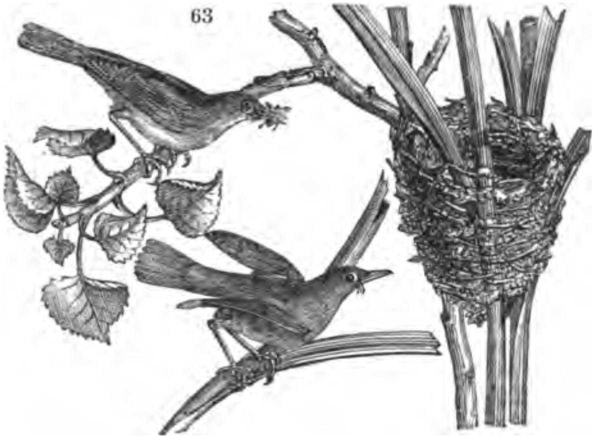

where I had frequent opportunities of observing the habits of the bird; for it abounds in the reeds [*A*rúndo *P*hragmìtes] on the banks of the Stour, and in the ditches communicating with the river.

Its congener, the sedge warbler (*C*urrùca salicària), seems to live with it in great harmony; but the reed bird confines itself rather closely to the reeds, while the sedge bird is as frequently to be seen and heard in the low hawthorn bushes and pollard willows which skirt the river: however, one of the specimens now sent was shot in a poplar tree, having left the reeds for this unusual locality but an instant before.

I discovered two nests: from one of them the young birds had just made their escape, and were clinging with their long claws to the reeds; in which situation the old ones appeared to be feeding them. The little creatures leave the nest long before their wings are of any use, and support themselves with great dexterity on their frail perches, the sport of every passing breeze, and, to all appearance, in imminent danger of being precipitated into the water. In the mouths of nearly all the old birds which I shot was a number of flies, generally small dragon flies; and these, I observed, were much moistened, and in some instances almost half-digested, either by the saliva of the bird, or by its ability to hold water for this purpose.* I was unable to make much observation upon the song of the bird, for the joyous days of sylvan melody had passed before my arrival in the country; all that I heard was a chirping note, very similar to that of the sedge warbler, although, perhaps, somewhat more hoarse and guttural.

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* This remark applies equally to the sedge warbler.

In one of the nests was an addled egg, which was thickly covered with very minute brownish green spots. Wool is the staple material of the nest; much exceeding in quantity the fine dried grass with which it is interwoven and with which the interior is lined: three reeds usually support the curious fabric, but in the present instance, a sucker from a poplar tree takes the place of one of them.

An attempt to rear the young birds in confinement entirely failed; one of them surviving only a day, and another about double that time. I am, Sir, yours, &c.

Stoke Newington, Sept. 30. 1831. J. G.

ART. III. *Further Observations on some of the Fishes of Cornwall.*

By JONATHAN COUCH, Esq. F.L.S. &c.

(*Continued from* p. 24.)

> ——— "The sounds and seas, each creek and bay,
> With fry innumerable swarm, and shoals
> Of fish that with their fins, and shining scales,
> Glide under the green wave, in sculls that oft
> Bank the mid sea: part single, or with mate,
> Graze the sea-weed their pasture, and through groves
> Of coral stray; or, sporting with quick glance,
> Show to the Sun their waved coats dropt with gold."
>
> *Milton.*

REMARKS ON THE SPECIES OF THE GENUS *TRI'GLA.*

TRI'GLA H*irúndo* (*Tub-fish*). — This is one of our commonest fishes. Its usual residence is at the bottom, in sandy or stony ground; but it sometimes rises to the surface, by the aid of its large pectoral fins, and strong and capacious air-bladder; an organ which in this genus is firm, and furnished with powerful muscles, interwoven with its tendinous structure. This fish, and perhaps most of its congeners, has the faculty of uttering distinct sounds, bearing a near resemblance to the grunting of a young pig; and this it will continue to do from the moment it is taken to near the time of its death.

The use of the pectoral processes is doubtful. They have numerous joints along their course, and are inserted on the clavicle by a joint that allows of extensive motion. A process or trochanter passes off, into which is inserted a muscle of great power. When either of these jointed organs is directed forwards, it naturally bends into an arch. The tub-fish sheds its spawn about Christmas, at no great distance from land. All the fishes of this genus are distinguished by their hard heads, formed of a crustaceous substance, enclosing and protecting the muscles; by their thick skin, stout bones, particularly the sternum or breastbone, and by the air-bladder, which may be taken from the body without discharging its contents.

Trígla lýra L. (*the Piper*). — Though the name of this species has a more direct reference to the sounds it is capable of uttering, it is not more distinguished for them than the tub-fish, and some others. The piper wanders about more than the others, at least, of the Cornish species; consequently it is sometimes common, and at others, somewhat rare.

The Streaked Gurnard (T. *lineàta* Turt. Linn.) was found in Cornwall, by Mr. Jago: but I have never had the good fortune to meet with a specimen.

T. *Cùculus* (*the Elleck*). (*fig.* 64.) — The elleck, red gurnard, or soldier, is called *Cù-culus*, the cuckoo, from a supposed resemblance of its sounds to the note of that bird; or, as Aristotle says, because it utters the word *koo*. It abounds at all seasons, and in its habits it resembles the tub-fish.

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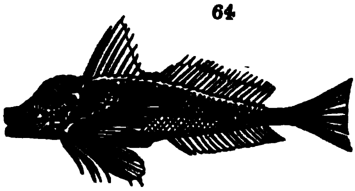

T. Gurnàrdus *L.* (*Grey Gurnard*). — Ray observes that the word gurnard, which may be regarded as the English term, is derived *a grunnitu*, from grunting like a hog. In this, however, I venture to think this eminent naturalist mistaken. Pengurn is the ancient Cornu-British name for these fishes, and signifies hard head; and its English translation is now sometimes given to the grey gurnard. From the Cornish word *gurn* (hard), I therefore derive the name, as descriptive of the head of these species.

This is a common fish at all seasons; but in December and January it sometimes abounds to such a degree, that, as they are not much esteemed, I have known them sold at thirty for a penny. It keeps near the bottom commonly, at no great distance from land; but sometimes multitudes will mount together to the surface, and move along with the first dorsal fin above the water: they will even quit their native element, and spring to the distance of a yard; thus imitating the flying gurnard, though not to the same extent. In summer they are found basking in the sun, perhaps asleep, as they will at times display no signs of animation, until an attempt is made to seize them.

Pellucid Ophidium (*Ophi'dium pellu'cidum Couch*).

This fish (*fig.* 65.), of which I have seen four specimens, is 5½ in. long, by half an inch deep; and so transparent, when living, that the colours of the vessel in which it was swimming, could be seen through the thickest part of its substance. Head small, sloping towards the mouth, compressed, under jaw shortest, gill membrane attached, the opening near the pectoral fin. Eye large and bright; vent 1½ in. from the head; at this point the body is deeper than along the abdomen, it then gradually grows narrower to the tail. Pectoral fins small, the dorsal fin beginning at about one third of the length of the body from the head, the anal at the vent; both joining to form the tail, as in the eel. Breast folded from the thorax to the vent. Lateral line straight, having along its course a row of black points; along each side of the abdominal plait, also, a row of points to the tail. The course of the ribs is distinctly marked; number of vertebræ counted, 150. The only opaque parts of this fish are the eyes; the iris resembling a plate of silver, the black pigment surrounding the posterior chamber also conspicuous; convolutions of the brain visible; no scales. One specimen differed from the others, in having two bifid teeth projecting forward from the under jaw; in proportion to the size of the fish they might be termed tusks: in this specimen, also, the body was raised a little immediately behind the head.

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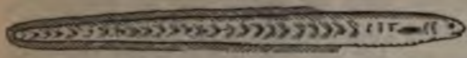

Miscellaneous Notes.

Mode of Propagation in Eels. — The generation of eels has been involved in extraordinary obscurity, notwithstanding the attention which eminent naturalists have paid to the subject. I have no doubt that the pearly white substance which lies along the course of the spine of this fish (the situation of the roe in most fishes) is the roe. Contrary to what is found in most species of fish, this roe contains a large quantity of fine oil; so free from fishy flavour, as to be commonly employed (at least, that found in the conger) in crusts and other culinary uses in Cornwall. In the fish its use seems to be to protect the delicate sexual organs from cold; for these organs are most developed in the coldest season of the year; and the whole constitution of the eel is remarkably susceptible of cold: it feels every change of temperature. There are no eels in the Danube, nor in any of its tributary streams. The rivers of Siberia, also, though large and numerous, are destitute of them *; but Bélon found them of very large size in the Island of Lemnos.

The eels which were the subjects of my observations and experiments were procured from the outer pier at Polperro, in the month of February; and, though the season was so cold that a sheet of ice was left on the beach when the tide receded, they seemed to have lost nothing of their activity. Placing a portion of this roe in the field of a powerful microscope, I find it consisting of globular grains, some far exceeding others in size; from which I conclude that some are just approaching to maturity; and that they are excluded in succession, considerable time elapsing between the expulsion of the first and last. It is impossible to imagine that these could ever have been hatched within the body; and still less, without that circumstance having long since been ascertained. The small size of the external orifice is a further proof of the same thing. To remove all doubt of this pearly substance being the roe, I burnt a portion of it in the flame of a candle, subjecting it at the same time to the judgment of one well acquainted with the smell of burnt roe of fish, which is sufficiently distinguished from every other smell. The individual was not acquainted with the intention of my enquiry, but the decision that it was the roe of fish was without hesitation. It is probable that the roe of the eel is rendered prolific previously to its exclusion; for Rondeletius says that he has seen eels cling together like dew-worms; it seems likely, also, that the grains are not deposited or covered, but rather left to float at random, as is certainly the case with many fishes. It seems difficult, on any other supposition, to account for the young eels coming to life at the distance of two or three leagues from land. Notwithstanding this distance, they soon find their way to the mouths of rivers. Young eels begin to appear in March, the earliest I have noted being on the 3d of that month, in 1828; and in 1830, after minute search, the first I could find was on the 24th. At this season, some are usually found so transparent that every internal action and organ may be examined. In making observations on eels, I have found much difficulty in keeping the fish in confinement; they made their escape from a large vessel, when the water was four inches below the brim. One was taken in the street on its way to the stream, others I never recovered; very small ones escaped with no greater difficulty than the larger. In all cases the escape was by night, I believe by placing the tail over the

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* See a historico-geographical description of the north and eastern parts of Europe and Asia, but more particularly of Russia, Siberia, and Great Tartary; by Philip John von Strahlenberg; 4to, 1738; p. 361.

edge of the vessel. I hope to be able to pursue this enquiry during the winter and following spring.

The true Sprat very rare in Cornwall. — In reference to some observations by Mr. Yarrell, in the *Zoological Journal*, vol. iv. p. 466., relative to the distinction between the sprat and the young of the pilchard and herring, I can state that Cornish fishermen term the young of both the latter fishes sprats; but, how far this should go in determining the judgment of a naturalist will appear, when I add that I have never seen above one specimen of the genuine sprat in Cornwall, and that was brought me by a fisherman, to be informed what fish it was. In taking fish out of his net by night, he felt it to be neither a pilchard nor a herring, and supposed it something rare.

The Black Fish of Jago, and its Synonymes. — I have only further to add that I can now clear up a doubt in British ichthyology that has existed for a hundred years. I have at last ascertained what is the black fish of Jago, the Pérca nìgra of Turton and other authors. I believe it to be the Pompilus of Gesner and Ray. Two specimens were taken here in 1830 and 1831: one of which I minutely examined, and preserved a drawing of; of the other I received a figure and description. An error in Borlase's original description, of three fourths of an inch instead of three or four inches, has chiefly led to the continued mistake respecting this fish.

J. Couch.

Some critical remarks on the want of proportion in some of our figures illustrative of Mr. Couch's first paper (p. 15—24.), will be found under Retrospective Criticism, in the present Number (p. 393.).

The Short Sunfish (*Orthagoriscus Mòla* Fleming). — The present will not be an unfit place to notice a somewhat recent capture, in the neighbourhood of Plymouth, of a species of fish of comparative rarity on our shores: the Tétrodon Mòla of the older authors, the Orthagoríscus Mòla of Dr. Fleming's *British Animals*. The following is a descriptive paragraph respecting it, which appeared in the *Mirror* of Sept. 10. 1831: —

" *Curious Fish.* — A most singular fish was brought to Plymouth, a short time since, by some fishermen, who secured it while driving for pilchards off the Mewstone. It was of an unknown species, not unlike a huge bream in shape, weighing 60 lbs.; and was 2 ft. 9 in. in length, 22 in. in depth, and about 8 in. in thickness. The dorsal and ventral fins were placed near the tail, stood off from the body, and measured each of them 1 ft. 3 in. long, both of them tapering to a point. The tail itself was 5 in. long and 16 in. in breadth, crescent-like in shape, and seemingly attached to the body by a kind of hinge. The fish had no nostrils; and its mouth was barely 1½ in. wide. Instead of teeth, it was supplied with two solid sharp bones, in the form of gums. Behind the pectoral fins, which were very small, were the oval openings to the gills, and they had something of the figure of the human ear. Its skin was perfectly invulnerable, of a silvery hue, inclining to blackness towards the ridge of the back. The total absence of gills gave the head a most awkward appearance. — *W. G. C.*"

On mentioning the occurrence of this fish to Mr. Yarrell, he, besides communicating the name as above, furnished the following list of references to most of the British authors by whom it has either been described or figured: —

The sunfish (Mòla Salviàni, *O*rthagoríscus Rondelètii), Willughby's *Historia Piscium*, p. 151. fig. I. 26. The short sunfish (Tétrodon Mòla *Linn.*), Pennant's *British Zoology*, edit. 1812, vol. iii. p. 172. *Céphalus* brèvis of Turton's *British Fauna*, p. 116. sp. 160. Tétrodon Mòla, Donovan's *Natural History of British Fishes*, plate 25. *Orthagoríscus* Mòla, Fleming's *British Animals*, p. 175. sp. 32.

This copious supply of references, so obligingly furnished by Mr. Yarrell, will enable the possessor of any one of these works to farther trace the history of this remarkable fish. — *J. D.*

ART. IV. *Descriptive Notice of the Char* (*Sálmo alpìnus* L.), *and mention of another Species of Fish.* By O.

Sir,

THE habits of fish are, for the most part, so imperfectly known, that any additional information on their history is acceptable. I, therefore, shall not apologise for troubling you with a few remarks on the char; the habits of which are, probably, as little understood as any. The char (*Sálmo alpìnus L.*) is found in several of the deep and rocky lakes of England: viz. Coniston in Lancashire, Windermere in Westmoreland, Buttermere and Cromackwater in Cumberland, and, I believe, in Ulswater. My observations are confined to Windermere. Windermere is fed by two streams, which unite at the head of the lake, named the Brathy and the Rothay: the bottom of the former is rocky, and that of the latter sandy. On the first sharp weather that occurs in November, the char makes up the Brathy, in large shoals, for the purpose of spawning, preferring that river to the Rothay, probably owing to the bottom being rocky, and resembling more the bottom of the lake; and it is singular that those fish which ascend the Rothay invariably return and spawn in the Brathay; they remain in this stream, and in the shallow parts of the lake, until the end of March. While spawning, their colour and spots are much darker than when in season; the mouth and fins being of a deep yellow colour; and they are covered with a thick slime at this time. In the water before Brathy Hall, at Clappersgate, hundreds may be seen rubbing and rooting at the bottom, endeavouring to free themselves from the slime, and probably insects that annoy them.[*] Great quantities are caught during the spawning time, by the netters, for potting, and some are sent up fresh for the London market; but those only who have eaten char in summer, on the spot, when they are in season, can tell how superior they are to those eaten in London in the winter. About the beginning of April, when the warm weather comes in, they retire into the deep parts of the lake; where their principal food is the minnow (*Cý*prinus *P*hóxinus *L.*), of which they are very fond. At this time, they are angled for by spinning a minnow; but, in a general way, the sport is indifferent, and the persevering angler is well rewarded if he succeed in killing two brace a day. A more successful mode of taking them is by fastening a long and heavily leaded line, and hook baited with a minnow, to the stern of a boat, which is slowly and silently rowed along: in this way they are taken during the early summer months; but when the hot weather comes in, they are seldom seen. They feed, probably, at night; and although they never leave the lake, except during the period of spawning, nothing is more uncommon than taking a char in July and August. When in season, they are strong and vigorous fish, and afford the angler excellent sport. They differ little in size, three fish generally weighing about 2 lbs.: occasionally, one is caught larger, but they seldom vary more than an ounce. The char, as it is well known, is a singularly beautiful fish, and is accurately described by Pennant. The fishermen about the lakes speak of two sorts, the case char and the gilt char; the latter being a fish that has not spawned in the preceding season, and on that account said to be of a more delicate flavour, but in other respects there is no difference.

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[*] On the analogy of the habits of the salmon, as described in Jameson's *Philosophical Journal* for April, 1828, this collision with the soil may be for depositing spawn or eggs therein. That work thus states: — "The salmon having left the ocean, and found in the fresh-water streams suitable places

Whilst speaking of the char, I cannot forbear adding a few words about another fish, which is found both in Windermere and Ulswater, and called, by those residing on the spot, the gray trout. Its habits, as to the time of spawning, and living only in the deep rocky lakes, resemble those of the char; but it grows to a very large size, and is sometimes caught in Ulswater weighing 15 or 20 lbs. I have endeavoured in vain to find some account of this fish: it bears some resemblance to the gwiniad, the schelly of Ulswater; but this fish, Pennant says, never weighs more than 3 or 4 lbs. It is most like the

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for spawning, the sexes, in November, December, and January, unite in making furrows in the gravelly shallows of the rivers to receive their spawn. From eight to twelve days are required before this process is completed. The spawn is afterwards covered with loose gravel, and remains till the suitable warmth of spring brings forth the fry."

Contributions towards a farther history of the salmon will be found in this Magazine, Vol. I. p. 170., and Vol. III. p. 94. 196. 480. — *J. D.*

fish referred to by Pennant, in his *British Zoology*, vol. iii. p. 423., in a note from Lacépède's *Sup. to Histoire des Poissons*, v. 696., and called Le salmone Cumberland. "Head small; eyes large; mouth large, with two rows of teeth on the tongue; scales small; general colour white; back gray; flesh pale and tasteless." In Ray's *Letters* there is a letter to him from Captain Hatton, in which this fish is obviously alluded to: the following is the passage: — "Whilst I am now writing, a Westmoreland acquaintance of mine, coming to see me, in discourse did accidentally mind me of the surprise I was in some years ago, at Lowther Hall, Cumberland, Sir J. Lowther's. Seeing at Sir John's table a fresh-water trout, which was 38 in. in length, and 27 in. in girth; taken in Hulswater, a large lake in Westmoreland, in which I was assured by Sir John and others, trouts of that size (nay larger) are frequently taken." Some of your correspondents may be able to give a fuller account of this fish.

I am, Sir, yours, &c.

Clapton, March, 1832. O.

THE strictures of A. R. Y., at p. 58., on the char, are a farther contribution to its history. — *J. D.*

ART. V. *On some remarkable Forms in Entomology, including a Notice of Mr. Stephens's Description of Chiasognàthus Grántii.* By J. O. WESTWOOD, Esq. F.L.S. &c.

AMONGST the almost (may I not rather say, absolutely?) endless variety of forms impressed by an all-wise Creator upon the animated works of the creation, it is a remarkable fact, that very few so entirely recede from the general structure of the great groups evidently existing in nature, as to require the establishment of fresh orders, or other primary sections for their reception in a systematic distribution. It more frequently happens that the attention of the naturalist is directed to objects which, although possessing the essential characters of the group to which they belong, exhibit the most remarkable appearances from the extraordinary developement of some one or more of their organs, and lead him, at first sight, to doubt the propriety of the location assigned to them. These objects are consequently regarded in the most interesting light, not only by the professed naturalist, on account of the peculiarity of their structure, but also by the amateur, from the grotesqueness or singularity of their appearance. Indeed, from the remarkable circumstance, that these creatures are generally of very rare occurrence, being seldom found in any great quantity, it is not surprising that authors should have seized every opportunity of minutely describing and illustrating their entire structure.

From the last labour of Linnæus, until the publication of the memoir noticed at the head of this article, the science of entomology has been enriched by the publication of several papers upon insects of the nature above alluded to, and which I propose briefly to lay before the readers of this Magazine; trusting that the singularity of the insects referred to will be a sufficient excuse for the details into which I shall subsequently enter, with a view of making known the entire structure of one of such remarkable creatures. And here I may note, that it is gratifying to our national pride, to observe that our own countrymen have not been backward in thus recording the existence of these almost anomalous objects.

The first memoir to which I refer, is that which closed the labours of the great Linnæus. The objects which terminated his scientific career were not unworthy of him, since in this memoir the genera Paússus and Diópsis were first described.

Of the genus Paússus, one species only was known to Linnæus; namely, the P. microcéphalus, or small-headed paussus, a outline of which I have given at *fig.* 66. This genus, which belongs to the beetles (Coleóptera), is at once distinguished by the extraordinary form of the antennæ, which, instead of being 11-jointed, possess only two apparent joints, the second of which is very variable in form, but constantly of very large size, and singular shape. Since the time of Linnæus, several species have been discovered, the genus has been formed into a family of several distinct genera; and in a memoir upon this family, which is intended for publication in the next part of the *Linnæan Transactions*, I have described nearly thirty species, illustrated with about seventy figures of the insects and their details.

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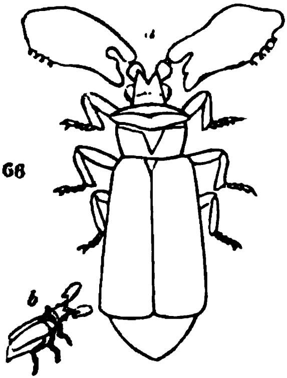
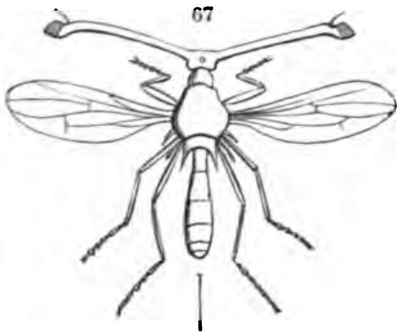


Paússus microcéphalus: *a*, magnified; *b*, natural size.

The genus Diópsis belongs to the order of two-winged flies (Díptera), and is remarkable for the spines upon the thorax, and for the extraordinary developement of the sides of the head, which are produced as long footstalks to the eyes, which are placed at the tip. One species only of this genus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was known to Linnæus. Four or five others have, however, recently been described by Continental entomologists. My own cabinet contains three other new and undescribed species, and I am acquainted with two or three others. The outline (*fig.* 67.) represents the large-eyed Diópsis macrophthálma of *Dalman.**

The second memoir to which I shall refer, was published by Francillon in 1795, containing a description of his splendid kangaroo beetle, Scarabæ`us mácropus (*makros*, long, *pous*, a foot), which was supposed to be a native of Potosi, in South America. The grotesque appearance of the insect, produced by the size of the hind legs, will be observed in my sketch. (*fig.* 68. natural size.)

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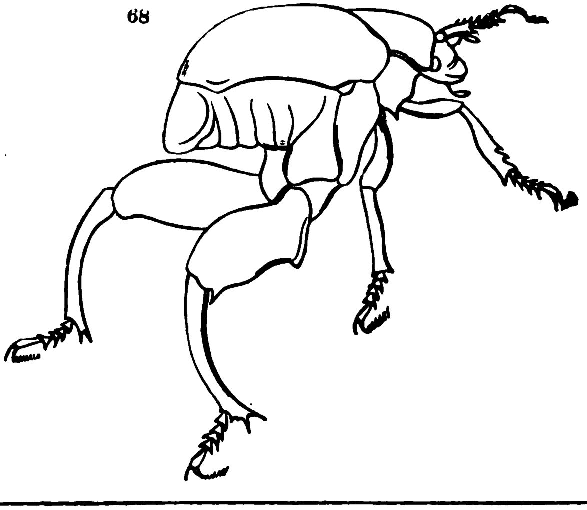

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* *Diopsis*, assisted inspection: *makros*, long, *opthalmos*, eye; pedunculated eye. As these ocular footstalks may be supposed to be flexible, and the eyes thereby applicable to a variety of directions, it may be remarked that this is not the case. Mr. Parsons, in his excellent " Account of the Discoveries of Müller and others, in the Organs of Vision in Insects and Crustàcea," states (Vol. IV. p. 220.): — " In insects, the eyes are almost always immovable; and, although in the genera A`chias and Diópsis, dipterous insects of hot climates, the eyes are fixed upon filaments, yet, even here, they invariably maintain the same position in relation to each other." — *J. D.*

We next proceed to the discovery and description of that perplexing insect, the Stŷlops melíttæ, and the establishment of the order Strepsíptera, the credit of which ought, in justice, to be given to Mr. Kirby; Rossi's meagre notice being almost worthless. These creatures, in their preparatory state, inhabit the interior of the abdomen of certain bees and wasps, from which they extricate themselves on arriving at their perfect state. *Fig.* 69. represents Dr. Leach's species, Stŷlops Kírb*ii*, in the perfect state, and exhibits the forked antennæ, the remarkable fan-like wings, and the short lateral appendages of the thorax, which analogically represent the true elytra, as Latreille, in fact, proved in the *Ann. Gén. des Scienc. Phys.*, vol. vi., by discovering their attachment to the mesothorax (see Kirby and Spence, iii. 592. note), long before Mr. Curtis published his illustration of the genus, in which he claimed this discovery.

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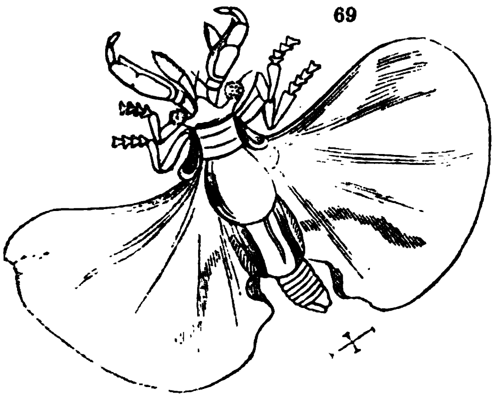
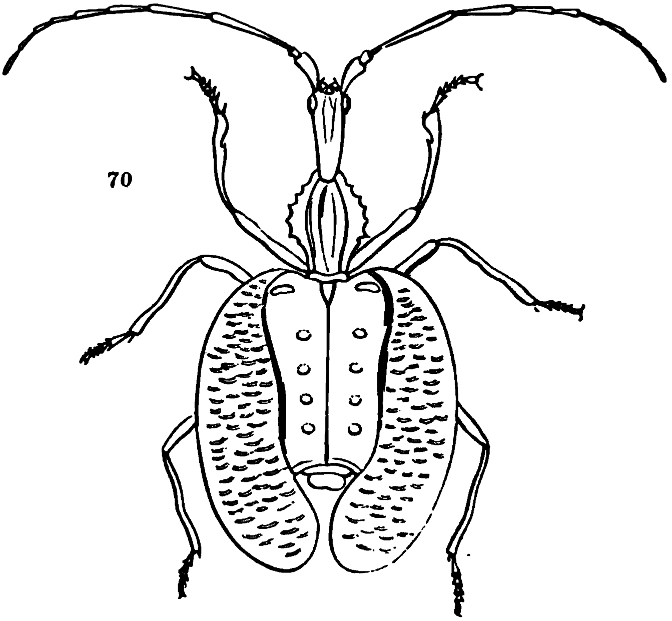


It has long been known that the genus Xènos (having the antennæ not articulated beyond the fork) is found both in the old and new world, but no species of Stŷlops (which has one of the branches of the antennæ jointed after the furcation) has hitherto been recorded as found in America. Mr. G. B. Sowerby has, however, had the good fortune to extract two specimens of a species of this genus (Stŷlops Childrèn*i* G. R. Gray), out of the abdomen of a North American bee, and I have figured it, with numerous details, in Griffith's translation of *Le Règne Animal*, Ins. pl. 59.

Mr. Curtis has recently established a third genus, in this singular order, under the name of Elénchus [a clearing up, a demonstration]. It is to be regretted, that, in illustrating the genus, Mr. Curtis did not introduce a figure of the front of the head. This would have cleared up the doubts which now exist respecting the structure of the only parts of the mouth which he has mentioned. In his description, these parts are described as "maxillæ, long, slender, lanceolate, and horny," and the fig. w 3. corresponds with this description, whilst in his fig. D 3., the organ which is figured is represented as three-jointed. Mr. Haliday calls them "palpi?" and, from analogy, I should certainly be inclined to adopt this denomination. In his observations upon the genus, Mr. Curtis speaks of the sexes, but in his description he is silent as to any sexual variation in the antennæ, abdomen, &c. The Stýlops tenuicórnis of Kirby is evidently, as the specific name at once suggests, the type of this genus, if, indeed, it be not the same species as the Elénchus Wálker*i*. When it is remembered that Mr. Kirby's specimen was found in a cobweb, allowance must be made for his insufficient description, but he expressly notices its small size, slender antennæ, and subsessile eyes.

The next memoir to which I purpose directing the attention of the student, is Hagenbach's *Description of the Marmólyce phyllòdes* [*marmolyce*, a hideous spectre, *phyllòdes*, resembling or abounding in leaves] (*fig.* 70., natural size), a Javanese species of Coleóptera belonging to, but totally unlike every known form comprised in, the Linnæan genus Cárabus; and remarkable for its flatness, and the great dilatation and posterior production of the sides of the elytra. The insect, indeed, at first sight looks more like a bit of thinly rolled gingerbread [Italian jumbles], such as we now see in the London 'kers' windows, than an animal. Upwards of thirty



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specimens of this extraordinary insect have recently been brought to England from Java.

The remaining memoir to which I shall refer is entitled "*A Description of Chiasognàthus* [*chiaso*, to run down, *gnathos*, a jaw; decurrent processes of the jaw] *Grántii* [George Grant, M.D., who imported the insect]; *an insect forming the type of an undescribed genus, with some brief remarks upon its structure and affinities;* by J. F. Stephens, F.L.S.;" a quarto tract, extracted from the *Cambridge Philosophical Transactions* for 1831, illustrated with two plates, containing coloured representations of the upper and under sides of this magnificent insect, with outlines of it in various positions, and of its essential organs, executed by myself.

This genus, as interesting from its structure, as it is remarkable for its splendour and colouring, belongs to the family of stag beetles, *Lucánidæ*; and, in order to render the following observations more intelligible, I here insert an outline of the insect (*fig.* 71.), of the natural size, omitting a portion of

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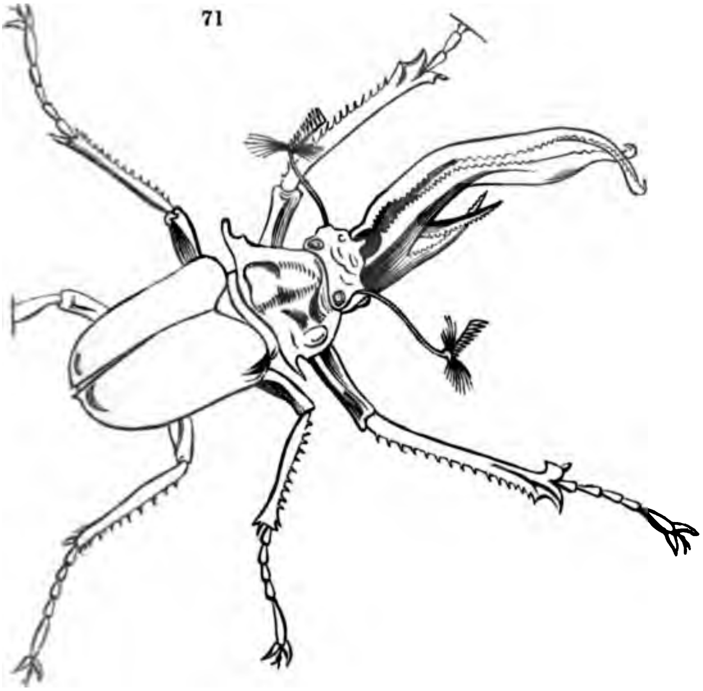

two of the limbs, rather than, by diminishing the size of the figure, lessen the effect of the object. Mr. Stephens has given a very full generic and specific description of the insect, and has stated that it was brought to Dr. Grant, surgeon on board his Majesty's ship Forte, on the South American station, by a native, who informed him that he found it on a resinous shrubby plant, in the Island of Chiloe, which is separated from the main land at Valparaiso by a very narrow channel. M. Dupont informs me that two specimens of the insect have lately been received in Paris. The following extracts from a letter addressed by myself to Mr. Stephens, dated 12th of January, 1831, comprise some of the observations made during the progress of my examination and delineation of the insect: —

"The golden bronze upon the elytra, the burnished golden green of the raised centre of the thorax, and the varying colours of its sides and of the lateral spines, together form an assemblage of tints exceeding in intensity every thing which I have hitherto met with in entomology. In the structure of many of its organs, equally striking peculiarities present themselves. The spines which arm the hinder margins of the thorax, and the whorl of hairs at the tip of the long basal joint of the antennæ, are characters which we look for in vain amongst the known genera of *L*ucánidæ, and which to myself are of great interest, as tending to prove the correctness of the opinion which I have advanced in the last number of the *Zoological Journal*, of the intimate affinity between the stag and capricorn beetles, *L*ucánidæ and *C*erambýcidæ. The furcate anterior produced part of the head (clypeus), the distinct existence of four eyes, the great strength of the fore legs, the extraordinary elongation of the basal joint of the antennæ, and the whorl of hairs above mentioned which ornament its tip (for I cannot imagine of what service it can be to the animal), are all characters of a very interesting kind. But it is in the structure of the mouth that the entomologist will derive the greatest interest. The upper jaws, or mandibles, (which, in our common powerful stag beetle, are scarcely longer than the head and thorax,) here acquire the length of the whole body; but although they are very strong, and evidently capable of biting very sharply at their base, towards the middle they become flattened, and at the tip they are deflexed and incurved, crossing over each other, so that this portion of the jaws can scarcely be of much service to the insect, when employed in the ordinary use of mandibles. Their very tips are also bent backwards; and here again we are at a loss to imagine for what purpose this last peculiarity has been bestowed upon the animal, since we can scarcely imagine (as a celebrated French entomologist has done respecting the hooks of the antennæ of the Paússidæ) that they are for the purpose of enabling this insect to suspend itself from the twigs of trees when asleep. On examining the jaws of the stag beetle, we externally perceive a tubercle at its base, which, in this new insect, is greatly developed into an additional pair of lower horns similarly crossing each other, and furnished along their inner edge with short spines.

" The upper lip, or labrum, is very distinct, being composed of a pocket-shaped leathery plate, with a strong rib down the centre. The terminal portion of the lower jaws, or maxillæ, is very long, delicate, and fringed with very slender hairs. The food of the stag beetles consists of the flowing sap of decaying trees, which is lapped up in the typical genera by the terminal plates of these lower jaws, and of the lower lip; but in this insect a difficulty appears to exist, from the very arched form of the upper jaws; since it is impossible for it, when standing upon the trunk of a tree, to apply these fine terminal plates to the tree, so as to collect the sap, without opening the jaws very wide. A similar difficulty exists in a mammalious animal, the giraffe; the singularly awkward position of which, when feeding from the ground, is well known. The case is not, however, exactly parallel, since the situation of the natural food of the giraffe does not require such an extraordinary exertion; whereas, in this insect, there appears no other manner of avoiding the difficulty, from the natural situation of its food.

" The lower lip (labium) and its appendages (instrumenta labialia *mihi*), although the least remarkable in appearance, are of equal interest with any other of the organs; since the investigation of their real structure involves the solution of the analogies of the various parts of the mouth, in the whole of the annulose sub-kingdom so elaborately treated by Savigny.* Hence, in consequence of the true analogies of the various organs not having been, as it appears to me, accurately traced by the learned authors of the *Introduction to Entomology*, an anomaly has been stated by them to exist in the stag beetles, the internal palpi being regarded by them as belonging to the tongue, and not to the lower lip. On examining the under surface of the base of the head of this new insect, we perceive a large, nearly square, sub-convex plate (jugulum), from the front of which arises a narrow transverse immovable plate, with the sides rounded (which, from the analogies existing between the structure of this insect, *L*ucànus, *M*elolóntha, Geotrùpes, *C*árabus, &c., I consider as the stirpes of the mentum, and which, in *L*ucànus, is much more developed, and broader in front). The true chin, or mentum, I consider to be represented by the semicircular plate, notched in front, which here, nevertheless, performs the true office of a lower lip, by closing the mouth. In addition to the three-jointed palpi, and their broad internal scapes, there only remain to be discovered the true lower lip (labium) and tongue (lingua). Now, in the English stag beetle, as in this insect, the bases of the scapes of the palpi are united by a fleshy tubercle, which, in the former insect, is adapted to a small notch or incision at the base of the mentum within; we can, however, scarcely consider this tubercle as the lower lip: whilst the only other part of the instrumenta labialia remaining unnoticed, are the two long and delicate central plates, employed, in conjunction with the maxillary plates, in lapping up sap, as above stated, which must consequently be considered as representing of themselves both the lower lip and tongue; and, from the analogies above pointed out, I cannot but consider that we are warranted in regarding the outer surface of these plates as representing the labium, and their inner surface the tongue. Hence, we shall be enabled to consider the palpi as truly belonging to the lower lip; or, perhaps, rather as arising between the chin and lower lip; which I apprehend to be the typical structure of the Coleóptera. The membranaceous plates of the lower lip are of a much more delicate structure in this insect than in *L*ucànus, as well as much more elongated, so as admirably to perform the office of a tongue: it also appears to me that, when alive, they are flat, and not curled at the sides, as they now appear in their dried state.*

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* Professor Rennie has attempted to ridicule, but has not disproved, Savigny's views. He will not be able to do the latter, until he can prove that the arm of a man, the fore leg of a quadruped, and the wing of a bird, are not the representatives of the same organ; often agreeing almost to the number of digiti, but varying in the mode of developement of the joints, so as to adapt them to their intended uses. Savigny's theory is but an application of this principle to groups but little understood.

Respecting the affinities of this insect, which is evidently of the male sex, the nearest approach to it is evidently made by the South American genus Pholidòtus. Indeed, in the structure of the lower jaws and instrumenta labialia of the two genera (if we except the coat of down with which the mentum in that genus is clothed) there is very little difference. The latter genus is evidently allied to Lamprìma, and these three genera

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* Any one who will take the trouble to cut off the large plate which closes the under side of the mouth of a stag beetle will be able to verify some of the preceding details, and will thereby be enabled much more readily to understand the subject.

(with the exception of Platýcerus) are exclusively[*] adorned with metallic colours.

"The three apical joints of the club of the antennæ in the male Pholidòtus are alone enlarged; the mandibles are clothed with down on their inner surface; and the mesosternum is slightly produced in front, as in Lamprìma. In varying, therefore, from Pholidòtus in these particulars, we find a near approach made to *L*ucànus, which is the only other genus of *L*ucánidæ that contains species which may vie, in general appearance, size, and strength of mandibles, with the present. Hence, we may consider Chiasognàthus Gránt*ii* as forming an interesting link between these two genera.

"The female, when discovered, will doubtless be found to possess short jaws, and the club of the antennæ not so much developed."

The Grove, Hammersmith, March 7. 1832.

In addition to the above valuable exhibition and description of insects remarkable for their forms, six very extraordinary instances, in as many species of the genus Centròtus, will be found in Vol. II. p. 20—22., in a communication from the Rev. W. Kirby. — *J. D.*

Art. VI. *Additions to the List of British Insects.* By Charles C. Babington, B.A. F.L.S. &c., St. John's College, Cambridge.

Sir,

The following insects, discovered to be British by myself or my friends, being excluded from the excellent works of Messrs. Stephens and Curtis by their respective plans, I have thought it would be advantageous to entomological students if they were published in this Magazine; and I cannot help expressing my hope that others will follow my example. The descriptions are taken from my own specimens.

I am, Sir, yours, &c.

Charles C. Babington.

1. Dro'mius lo'ngiceps? *Dej. Coleop.* ii. 450.? D. monosti'gma *mihi MSS.*

Elongato-linearis, pallidè fusco-ferrugineus, thorace subquadrato, elytris striatis, obsoletissimè punctatis, suturâ et maculâ communi subapicali cuneatâ nigris, antennis pedibusque pallidis. (Longitudo corporis 3 lineæ.)

Much elongated, nearly linear, pale ferruginous; head darker, with a transverse elevated line between the antennæ, and two oblique longitudinal punctate foveæ between the eyes; thorax quadrate, narrowed posteriorly, with all the angles rounded, lateral and posterior margins elevated, transversely wrinkled, with an abbreviated dorsal channel; elytra striated, striæ obsoletely punctate, suture dark, the colour widening toward the apex into a posteriorly rounded dark spot; under side pale ferruginous, abdomen darker; legs and antennæ pale.

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[*] I have lately seen, in the rich cabinet of the Rev. F. W. Hope, a metallic-coloured *L*ucànus, which more satisfactorily confirms the affinity subsequently stated above.

Probably D. lóngiceps of Dejean, but certainly distinct from D. lineàris; differing in the space between the eyes not being longitudinally wrinkled, as in that insect, the more quadrate thorax, and the wedge-shaped posteriorly rounded sutural spot on the elytra; the form, also, is much more elongate and linear.

Taken in Madingley Wood, Cambridgeshire, from moss, in the spring of 1831; and in the boats which bring the sedge [*], from the fens, to Cambridge, in March, 1832.

2. D. QUADRISIGNA′TUS *Dej. Coleop.* i. 236.

Pallidus, capite nigro, thorace quadrato, rufo, elytris basi, suturâ, angulis humeralibus, fasciâque posticâ fuscis, subtus piceus. (Long. corporis 2 lin.)

The same form as D. 4-maculàtus, but much smaller. Head black; thorax quadrate, rufo-ferruginous, with the margins paler; elytra pale yellow, with, a little behind the middle, a broad transverse brown fascia, dilated posteriorly on the outer margin, and connected by the suture with a triangular spot of the same colour at the base, the exterior angles of which are a little produced, so as to form an elongated patch on each side of the elytra; apex of the suture pale; abdomen piceous beneath, with the thorax paler; legs and antennæ pale.

Differs from D. sígma, under which name it has stood in my collection, by having the triangular spot, &c., at the base of the less faintly striate elytra, the fascia not dentate anteriorly, and the under side piceous. Taken in Madingley Wood, in March, 1831.

3. HYDRO′PORUS JUGULA′RIS *mihi.*

Oblongo-ovatus, niger, glaber, jugulo [†], antennis pedibusque ferrugineis. (Long. corp. [?] lin.)

Oblong-ovate, black, glabrous; head with the hinder margin of the vertex and the throat ferruginous; thorax with the lateral margins very obscurely ferruginous; elytra black, thickly but finely punctate throughout; body beneath shining black, punctate; legs ferruginous; antennæ the same, with the apex of the terminal joints fuscous.

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[*] It is worth stating, that the sedge so extensively used in Cambridgeshire for thatching, heating ovens, and lighting fires, is mainly composed of the herbage of Clàdium Maríscus *Eng. Bot.*, t. 950.; that of Càrex ripària, paludòsa, and, doubtless, other species, being blended with it in small proportions. Smith's *English Flora* (vol. i. p. 36.) represents Clàdium Maríscus as "not common:" it is, notwithstanding, no rarity in the fens of Cambridgeshire. The dried herbage, doubled into cylindrical wisps of 6 in. or 8 in. long, and 3 in. in diameter, is generally used in the town of Cambridge for lighting fires, in the manner the bundles of split fir-wood are used in London. — *J. D.*

[†] Jugulum, the throat; "that part of the surface which lies between the temples." (Kirby and Spence's *Int. to Entom.*, iii. 366.)

Var. β, with the upper surface less thickly but deeply punctate, and very shining.

Distinguished by its oblong form, glabrous body; and having the throat, legs, and antennæ ferruginous.

Taken by my friend T. C. Thompson, Esq., "in a pond at Kirby Hall, near Boroughbridge, Yorkshire, towards the end of August, 1831."

4. Colymbe'tes branchia'tus *mihi*.

Oblongo-ovatus, convexus, niger, subtilissimè punctato-strigosus, antennis ferrugineis, pedibus fuscis, elytrisque lineolâ obsoletâ fenestratâ. (Long. corp. 3 lin.)

Small, oblong-ovate, convex, black, very finely punctate-strigose; head black, with two obsolete testaceous spots on the crown; antennæ ferruginous; thorax as in C. affìnis; elytra oblong-ovate, nearly linear, convex, with, a little behind the middle, a very obsolete pale line near the outer margin; each elytron has on its disk three irregular rows of punctures becoming scattered towards the apex, where near the suture is an irregular stria of impressions; body black beneath, irregularly strigose; two anterior legs dusky ferruginous, four posterior pitchy black.

Differs from C. affìnis in having the four posterior legs pitchy black, apparently only one very obsolete fenestrated spot on each of the elytra, the anterior margin of the head black, and the shape much more linear.

Taken in "North Wales," by my friend C. Darwin, Esq., in the summer of 1830.

5. *E'lmis* rugo'sus *mihi*.

Lineari-elongatus, niger, antennis pedibusque rufis, thorace bilineato, elytris punctato-striatis, interstitiis rugosis, striâque elevatâ unicâ. (Long. corp. ¾ lin.)

Linear-elongate, depressed, black; thorax quadrate, with a curved line on each side scarcely approximating in front, the intermediate space slightly, and the exterior margins thickly, punctate; the anterior margin slightly rufous; elytra elongate, depressed, punctate-striated, the striæ vanishing towards the apex; the third from the margin elevated, and the interstices rugose; antennæ and legs rufescent.

Near to *E.* parallelipípedus, but may be known from that species by the rugose interstices of the elytra, the absence of the central impressed dot on the thorax, and in having the striæ not continued to the apex of the elytra, as in that insect.

Taken at Bath, in August, 1831.

6. Mala'chius bipuncta'tus *mihi*.

Nigro-virescens, thorace toto elytrorumque apice pallidè rufis, in ipso apice punctis duobus impressis nigris, tibiis tarsisque pallidis. (Long. corp. 1⅓ lin.)

Blackish green, glabrous; mouth pale; thorax entirely pale rufous; elytra blackish green, with the extremity pale rufous, and an impressed slightly lunate black spot very near the apex of each; abdomen blackish; tibiæ and tarsi rufous, with the last joint of the latter black; antennæ with the three basal joints red, the first being dark above, the fourth and to the end dark.

This insect is most nearly allied to M. ruficóllis, from which it differs in the small extent of the red part of the elytra: in this not occupying more than a fourth of the elytra; but in that, above half. M. ruficóllis, also, has not the two black spots at the apex; and the antennæ have one additional red joint, viz. the fourth: the form also is different.

One specimen taken at Monkswood, near Sawtry, Hunts, and two in the fens of Cambridgeshire, in May, 1831.

We beg to express our admiration of our obliging correspondent's act of translating his own descriptions. This is respectfully desired of all correspondents who may wish to describe in Latin; for as, conformably with the object of this Magazine, which is to familiarise and popularise natural science, the Latin descriptions must be translated, no one is so likely, from some degree of amphibology which attaches to Latin, to apprehend precisely the describer's meaning as the describer himself. — *J. D.*

Art. VII. *List of Papiliónidæ occurring in the Vicinity of Dover.* By the Rev. W. T. Bree, M.A.

Sir,

The following list of *P*apiliónidæ found in the vicinity of Dover may not, perhaps, prove unacceptable to some of your entomological readers; to such, at least, as may in future visit this now fashionable watering-place. As my residence here did not commence till the second week in August, of course the season for many of our papilios was gone by. Some species, therefore, which, owing either to the late period of the year, or to their own intrinsic rarity, I had not myself an opportunity of observing alive and at large, I have inserted on the authority of Mr. Le Plastrier *, of Snargate Street, Dover, who has long paid attention to the insects of this district; and to such articles I have affixed the letter L. The list, too, may not prove quite without interest, as well by showing what *is* to be found in this neighbourhood, as likewise what is *not*, or at least not commonly: and in this respect the district, it strikes me, has its peculiarities. For example, Argýnni*s* Aglài*a* occurs, but not its near ally Adípp*e*; the rare Melitæ`*a* Cínxi*a* is taken, but not Dictýnn*a* or A'rtemi*s*; Euphrósyn*e*, but not Selèn*e*; and (I speak on the authority of Mr. Le Plastrier) scarcely Argýnni*s* Pàphi*a*.* From the comparative want of oak trees, Thècl*a* quércus is very seldom met with; and the same circumstance will at once be sufficient to account for the absence of Apatùr*a* I`ri*s*. Vanéss*a* polychlòros and c. álbum are both very rare in this district; the latter we might have expected to meet with, as the hop (Hùmulus Lùpulus *L.*), one of the plants on which the caterpillar feeds, as well as on nettles (*U*rtìca dioíca *L.*) which are common every where, abounds both in a wild and a cultivated state. Mr. Le Plastrier informs me that he has not seen V. c. álbum for these last twelve or thirteen years. I could not help remarking, also, the comparative rarity of an insect exceedingly common in most places, Pónti*a* nàpi. In the course of many mornings' rambles, I scarcely met with more than two examples. Its congeners, P. brássicæ and ràpæ, are unusually abundant; owing, no doubt, to the vast quantity of sea cabbage (*B*rássica olerácea *L.*) which grows spontaneously on the cliffs, and affords, in addition to the ordinary supply of the gardens, an ample and never-failing store of food for the caterpillars. One very scarce insect (Polyómmatus Arìo*n*) I have not ventured to enumerate in the list; though it is stated by Mr. Stephens, and, I believe, by others, to have been taken near Dover, and also near Deal. His authority I do not mean to impugn; but, upon enquiry, I learn that Mr. Le Plastrier, in all his practice, never took the insect; though he has heard some vague accounts, from non-entomological reporters, of a *large* blue having occasionally been seen in the vicinity of Dover, which might possibly have been this rare species.

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* Mr. Le Plastrier collects insects for sale, and is, I believe, well known to many eminent entomologists. All collectors who visit Dover I would strongly recommend to apply to Mr. Le Plastrier, whom, I will venture to say, they will find ready, in the most obliging manner, to communicate any information he may possess respecting the localities, habits, and periods of the insects to be met with in the neighbourhood. Mr. Curtis has named the Dover Tortrix moth, Carpocápsia Leplastriána, after this assiduous ollector.

As the insects of any country depend in good measure on its vegetable productions, it may not be unimportant to enumerate here some of the plants common in this neighbourhood. The soil of Dover, it is almost unnecessary to state, is chalk; and, accordingly, the district abounds with such chalk-loving species as the following, viz.: — Scabiòsa [Asterocéphalus *Vaillant*] columbària, *P*astinàca satìva, *E*`chium vulgàre, Erythræ`a *C*entaúrium, *Gentiàna* Amarélla, Chlòra perfoliàta, *R*esèda lùtea, *R*ùbus cæ`sius, *C*ìstus Heliánthemum [Heliánthemum vulgàre *Gærtner*], *G*aleópsis *L*ádanum, *O*ríganum vulgàre, *A*nthýllis Vulnerària, Hippocrèpis comòsa, *H*edýsarum *O*nobrýchis [*O*nobrýchis satìva *Lam.*], *S*isýmbrium tenuifòlium [Diplótaxis tenuifòlia *Decandolle*], *P*ìcris *h*ieraciöìdes, *C*ichòrium *Í*ntybus, *C*nìcus acaúlis, Carl*ìna* vulgàris, *C*onýza squarròsa, *E*rígeron àcris, Solidàgo Virgaúrea, *C*entaurèa Scabiòsa, *P*otèrium Sanguisórba, *M*ercuri*àlis* ánnua, &c. &c.; and among the less common species may be mentioned, Aspérula cynánchica, Linària mìnor, *L*áthyrus sylvéstris, *V*ícia sylvática, *L*actùca viròsa, Neóttia spiràlis (in greater abundance than I have elsewhere observed it), *C*árpinus *B*étulus, *J*uníperus commùnis, *H*ippóphaë *r*hamnöìdes. On the cliffs and sea-beach, some of the usual maritime plants are found, such as *C*ríthmum marítimum, *G*laúcium flàvum, *S*tátice binervòsa (see *Eng. Bot. Supp.*, pl. 2663.), *B*èta marítima, &c. But the coast immediately about Dover, it strikes me, is not very rich in what are termed maritime plants.

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* I have lately been informed, by a young entomologist, that he took Argýnni*s* Pàphi*a* this year, near Folkstone. Mr. Le Plastrier, too, has occasionally met with it, though very rarely, near Dover.

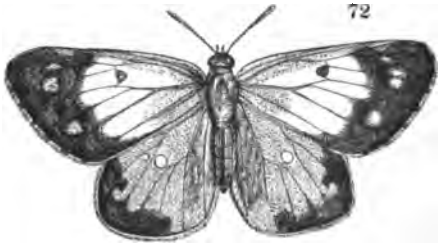
I am, Sir, yours, &c.

Dover, *Sept.* 30. 1831. W. T. Bree.

List of Papiliónidæ *found near Dover.*

Those articles to which an asterisk (*) is affixed after the letter L, are in the cabinet of Mr. Le Plastrier of Ramsgate.

Còlias Edùsa, clouded yellow.[†] C. var., white clouded yellow; *P*apílio Hélice of *Haworth* [‡] (*fig.* 72.). C. var., with the margins of the wings



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[†] Of this species, which, it is well known, occurs plentifully in particular seasons, while in others it is hardly to be met with, there was a considerable flight in the neighbourhood of Dover during the months of August and September. If I mistake not, it occurs principally in maritime counties: I do not mean that it is confined to such situations, but that it is met with far more copiously near the sea-coast than elsewhere. The only places in which I have ever seen it in any thing like abundance are the Isle of Wight, and the opposite coast of Hampshire, in the year 1804; and this season, in the neighbourhood of Dover, viz. near the signal-station to the east; St. Margaret's Bay; near Folkstone, and between that town and Sandgate; some specimens also near Hythe and Canterbury. In Warwickshire, and the midland counties, I never saw more than two, or at the most three, specimens on the wing; and those in different seasons, 1808 and 1811.

[‡] This rare variety of the female Còlias Edùsa was at one time supposed to be a distinct species, and, as such, published in Haworth's *Lepidóptera*

brown, not black, L.* C. Chrysótheme? L.* [†] C. Hyále, pale clouded yellow, L. C. var., white, L.* [‡]

Gonépteryx rhámni, brimstone.

Póntia brássicæ, large garden white. P. rápæ, small garden white. P. nápi, green-veined white. P. Daplídice, Bath white, L.* [§] P. cardámines, orange tip, L.

Leucophàsia sinàpis, wood-white.

Británnica, under the name of Papílio Hélice; a name, I believe, originally given by Hübner. It differs from the ordinary female examples of Edùsa in no respect save in colour; being, instead of bright orange yellow, of a greenish white, suffused, at the same time, on the abdomen and adjoining parts of the inferior wings, with a very slight tinge of sulphur colour. A corresponding example of the male has never, I believe, been met with. That it is to be considered a variety merely of Edùsa, not a distinct species, I feel satisfied from what I observed in the instance of the specimen here figured, the only one I ever saw alive. I took it close to the town of Folkstone, to all appearance but recently emerged from the chrysalis, on the 3d of September. It would probably have escaped my notice, as it sat with expanded wings on a flower at some distance from me, had not my attention been drawn to it by a male Edùsa which was flying about, and, attracted by its mate, at length settled on the same spot. From the bearing of the two insects towards each other, no reasonable doubt could remain that they were male and female of the same species. Two very fine specimens of the white clouded yellow are in the cabinet of Mr. Le Plastrier of Ramsgate. The variety is figured in Stephens's *Illustrations*, Haustellàta, vol. i. pl. 2. fig. 3.

[†] I insert this insect with a mark of doubt, being by no means certain whether the specimens I have seen (a male and female, taken near Dover, and in the cabinet of Mr. Le Plastrier, Ramsgate) are any other than strong varieties of Còlias Edùsa. They are much smaller, however, and have the black marginal band broader than in that insect. Còlias Chrysótheme of Stephens's *Illustrations*, I am informed, is not the true Chrysótheme of the Continental writers; which, however nearly it may approach Edùsa, is said by them to differ from that insect in the larva state. As the discovery of truth should be the aim of all naturalists, Mr. Stephens, I trust, will excuse me when I state that I hear the greatest doubts entertained on the subject of Còlias Europòme, figured by him, being a British species. The specimens to which he refers in his *Illustrations* as having been taken between Brighton and Lewes, I am informed, were undoubtedly no other than Còlias Hyále. I do not mean to insinuate that so acute and experienced an entomologist as Mr. Stephens could mistake the one species for the other; but, possibly, foreign examples of the true Europòme may have been put off upon him (as I know they have upon others), either by mistake or design, as native ones captured in the above-mentioned situation. Còlias Europòme, I am assured, is not even a European species.

[‡] This pale variety, which is nearly white (see Lewin's *Papilios*, tab. 33. fig. 3. and 4.), bears about the same relation to Hyále that Hélice (white-clouded yellow) does to Edùsa: but, in the case of the white variety of Hyále, examples of both sexes occur. Mr. Le Plastrier of Ramsgate possesses a beautiful series of specimens of this rare insect, taken chiefly, if not entirely, near Dover. Còlias Hyále appears to be a maritime fly, occurring almost exclusively near the sea-coast.

[§] A beautiful specimen of the male, in the most perfect state of preservation, in Mr. Le Plastrier's cabinet, Ramsgate; taken in the meadow under Dover Castle, in the month of August. Mr. Stephens also mentions his having taken a specimen in the same place.

Pìeri*s* cratæ'gi, black-veined white, L.

Melitæ'*a* Cínxi*a*, Glanville fritillary, L. M. Euphrósyn*e*, pearl-bordered fritillary, L.

Argýnni*s* Pàphi*a*, silver-washed fritillary, L. A. Lathòni*a*, Queen of Spain fritillary, L.* † A. Aglài*a*, dark green fritillary, L. A. var., very pale, L.* ‡

Vanéss*a* c. álbum, comma, L. V. polychlòros, large tortoise-shell, L. V. urtìcæ, small tortoise-shell. V. I'*o*, peacock. V. Atalánt*a*, red admiral.

Cýnthi*a* cárdui, painted lady. §

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† A pair of specimens, male and female, in Mr. Le Plastrier's cabinet, Ramsgate; taken near Dover Castle, I believe, in the month of August or September.

‡ A singular variety, pale buff-coloured, and with the black spots and markings very faint. It was taken, as I am informed, in a remarkably wet season. The specimen reminds one almost of some plant, which, having grown in the dark, has, in consequence, produced its flowers nearly colourless.

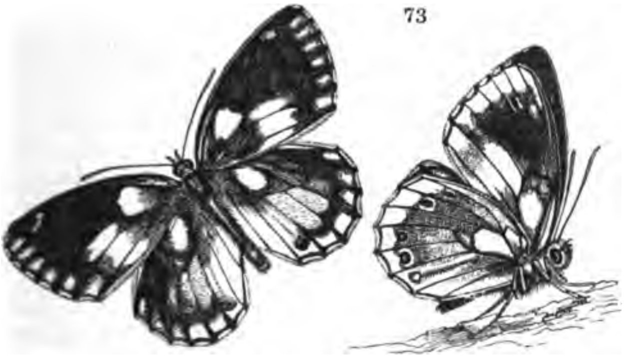
§ May I here venture to question the propriety of separating, so far apart as to place in different *genera*, two insects so closely allied to each other in their general appearance, markings, and habits, both in the larva and winged state, as Atalánt*a* and cárdui? Nature seems to have made them congeners. If cárdui be removed from the modern genus Vanéss*a*, so ought Atalánt*a*; and still more, perhaps, c. álbum, on account of the singular conformation of its wings: the removal of which last species, however, from urtìcæ and polychlòros, would yet be extremely unnatural. That the old Linnæan genera admit, nay require, manifold subdivisions, more especially now that there has been such a vast accession of newly discovered species since the days of the great Swede, no one at all acquainted with the subject will dispute: but it is very possible, and very common, to run from one extreme into its opposite; and, in avoiding Scylla, to fall into Charybdis. Is not the modern rage for multiplying genera carried beyond all reasonable bounds? and does not the practice tend rather to encumber than to advance what is called the *science* of natural history, as well as to deter many from the pursuit of it? Perhaps I shall be told that I have not sufficiently studied generic characters; and that, if I had done so, I should be at once reconciled to all the innovations that have been introduced. It does appear to me, however, that the systematists of the present day are occasionally guilty of what may be proverbially called "splitting hairs," or "spinning too fine:" and the unavoidable consequence is, that each department of natural history is now so clogged with a multiplicity of additional hard names, that many a systematic work becomes no better than a sealed book to all but the profoundly scientific, who can devote not their leisure merely, but their entire undivided attention, to the subject. "The professional students," says a pleasing modern writer, "ought to be to society what pioneers are to an army on its march, — they should go before it and clear the way, so that it may advance the faster. But if the pioneers were to block up the way behind them, just in order to make their own progress the more rapid, it would be difficult to point out the advantage that they would be to the army." (*British Naturalist*, vol. i., introduction, p. 10.) I have been led into these remarks, so far as they apply to the case of the two insects above mentioned, more particularly by having lately observed, in the rich cabinet of my friend Mr. Haworth, a species (of Vanéss*a*, must I say, or of Cýnthi*a*?) precisely intermediate as to colour, and markings, and general appearance: an exact "connecting link" between Atalánt*a* and cárdui. Of this interesting species Mr. Haworth possesses two examples; one from

Hippárchia Ægèria, speckled wood. H. Megæ`ra, wall. H. Sémele, grayling. H. Janìra, meadow brown. H. var., of a uniform pale buff colour, L.* H. piloséllæ, large heath, L. H. Galathe`a, marbled white. † H. var., black and but slightly marbled, L.* ‡ (See *fig.* 73.) H. Hyperánthus, ringlet. H. var., with the ocelli nearly obliterated, L. H. var., with the ocelli very large and distinct, L.* H. Pámphilus, small heath. H. var., very pale buff, with dark margins to the wings, L.*

Thècla quércus, purple hair streak, L. T. rùbi, green hair streak, L.

Lycæ`na Phlæ`as, common copper.

Polyómmatus Argìolus, azure blue, L. P. A´lsus, small blue. P. var., without the ocellated dots beneath, L.* P. Córydon, chalk-hill blue. P. var., with the ocellated dots beneath nearly obliterated, and the marginal marks very strong, L.* P. Adònis, Clifden blue. P. var., both sexes with the ocellated dots beneath nearly obliterated, L.* P. I´carus, common blue. § P. I´das, brown blue. P. A´rgus, silver-studded blue, L. P. var.,



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India, and the other, more recently received, from China; and these, he informs me, are the only specimens which, in all his practice, he has ever seen.

† Hippárchia Galathe`a, which, in Warwickshire, I am accustomed to find only in bogs, and in the moist, open, grassy parts of woods, is very abundant at Dover, on the dry banks about the castle, on the higher parts of the downs, and the tops and sides of the cliffs. Haworth (in *Lep. Brit.*) says, "Habitat in sylvaticis humidis." I am informed that the German naturalists enumerate several very closely allied species. It may be worth while to submit to a minute comparison specimens occurring in such widely different situations as the dry chalk banks of Dover and the bogs of Warwickshire, in order to ascertain whether two distinct species may not have been confounded together.

‡ A very singular and strongly marked variety, taken near Dover, and now in the cabinet of Mr. Le Plastrier of Ramsgate, who has kindly lent the specimen for the purpose of being figured. The upper wings are nearly black above, except a large white spot near the base, and another tripartite at the lower edge; and, beneath, both pairs are clouded with black, and almost destitute of the usual angular tessellated markings. This is, so far as I know, a unique specimen. I have no hesitation in calling it a *variety* only of Galathe`a, though it possesses amply sufficient characters, should other like examples occur, to constitute a distinct species.

§ Some entomologists entertain an opinion that more than one distinct species may, perhaps, be included under this name. Individuals of the male without the spots beneath, and the red marks on the margin of the posterior wings, L.*

Thýmele málvæ, grizzled skipper, L. T. Tàges, dingy skipper, L.

Pámphila sylvànus, large skipper. P. cómma, silver-spotted skipper. P. línea, small skipper.

P. S. — Since the above list was prepared, I have been favoured with an inspection of Miss Harvey's cabinet, who resides at Upper Deal; and observed therein the following species, in addition to those already enumerated, viz.: — Melitæ̀a Selène, Dictýnna, and A'rtemis; all of which, I was informed, had been taken in the neighbourhood of Deal or Canterbury. The same lady also showed me a fine specimen of Còlias Hỳale, taken in June last, in a field of clover or saintfoin, near Deal; and likewise a specimen of Papílio Machàon, which she had reared from the caterpillar: the only instance that had come to her knowledge of the insect occurring in that vicinity. Vanéssa Antìopa had been seen settling on a wall in Admiral Harvey's garden, in the month of August; but my intelligent informer was unable to capture it. A single specimen also of V. c. álbum had been observed in the same situation last summer, which is considered a very rare insect in that part of the country. W. T. B.

Allesley Rectory, Nov. 10. 1831.

ART. VIII. *Some Account of a Species of A'carus (?) which infests Butterflies.* By the Rev. W. T. BREE, M.A.

Sir,

HAVING, in the preceding article, given a list of Papiliónidæ found near Dover; as an appropriate sequel to that list, and intimately connected with the subject of it, I now take occasion to notice a small parasitical insect (*fig.* 74., and magnified *fig.* 75.), which I suppose to belong to the genus A'carus †: I

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sex vary considerably in size, and the females exceedingly so in colour; some having the wings brown above, and others more or less of a fine purplish blue. Of the latter sex, I observed some remarkably blue specimens, in a perfectly fresh state, in the Castle meadow, the last week in September.

† Since writing the above, I have met with the following account, in Professor Rennie's *Insect Miscellanies* (p. 27.), of what I have no doubt is the same insect: — "A species," he says, "of this family (*Acarìna*,) probably the red tick (Pedículus coccíneus *Scopoli*), or a mite (Léptus Phalángii) described by De Geer, appears to be much more indiscriminate [than the harvest bug, Léptus autumnàlis,] in its tastes; for, during the summer of 1830, we found it at Havre de Grace, infesting insects of the different families. It particularly abounded on the marbled butterfly

speak doubtfully, however, not having at the present moment an opportunity of referring to any works on natural history. Were the insect I allude to known to Linnæus*, I would almost venture an opinion that he would have named it *A'*carus lepidopteròrum: but whether or not he describes the species in question, or any other under that name, my memory does not serve me. I think I have formerly observed this *A'*carus (?) adhering to Hippárchi*a* Galathè*a*, but never in the same abundance in which it is to be met with in this neighbourhood: here the butterflies are, if I may be allowed the expression, absolutely lousy with it. I have no microscope at hand, save an ordinary pocket lens, to enable me to give an accurate and minute description of the little parasite; its general appearance is bright red, about the colour of sealing-wax; in shape oblong, cylindrical, but somewhat flattened beneath; and about the size, or nearly so, of one of the small seeds of the prince's feather (*A*maránthus hypochondrìacus); legs (six in number?) and antennæ so minute as not to be visible to the naked eye; when crushed, it gives out a fine orange colour. It adheres in clusters under the eyes of lepidopterous insects,

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(Hippárchi*a* Galathè*a* Leach), so that many of them were scarcely able to fly from the exhaustion caused by these little bloodsuckers; and so pertinaciously did they retain their hold, that several of them now adhere to the specimens of the butterfly in our cabinet. What was most remarkable, although the ringlet butterly (H. Hyperánthu*s*) was plentiful at the same time, and is similar in food and habits, not one of the parasites was found on some hundreds which we caught expressly to ascertain the fact. This appears the more strange, as several dragon flies (Libellulìna *MacLeay*) were found as much infested with them as the marbled butterfly. We also, more than once, found them on field crickets, ants, and beetles, and once on a harvest spider (*P*halángium *O*pílio)." This account corresponds in the main with the Dover *A'*carus, save that I could observe the parasite on no other than on lepidopterous insects; nor did the butterflies infested with it appear to me to be in the least incommoded in their flight by such encumbrance, not even the small blues (Polyómmatus I'caru*s* and Adòni*s*), though they had frequently five or six or more *A'*cari adhering to them: on the contrary, they sported about as briskly as usual, and to appearance seemed quite unconcerned. I may remark, too, that, with respect to Hippárchi*a* Galathè*a*, that insect at the best of times evinces no great power of wing; but usually flies about heavily and slowly, frequently settling on some stalk of grass, &c., and on such occasions keeping its wings expanded. Unless Professor Rennie bore this circumstance in mind, it is possible that he may have very naturally attributed the ordinary heavy flight of Galathè*a* to the encumbrance caused by the *A'*cari.

* On subsequently referring to Linnæus, I think it not improbable that our insect may be the same which he describes by the name of *A'*carus gymnopteròrum (*Fauna Suecica*, edit. altera, p. 483.); and of which he says "habitat in culicibus, apibus, aliisque, uti sequens acarus [*A*. coleoptratòrum] in coleoptratis." It infests gnats, bees, and other insects, as the following species, *A*. coleoptratòrum, does coleopterous.

between the legs, at the base of the wings, and at the junctures of the thorax with the head and with the abdomen, both above and beneath. The insects on which I have chiefly observed it are, Hippárchi*a* Galathè*a* (*fig.* 74. *b*) and Janìr*a*, Polyómmatus I´carus (*a*), and Adònis, Anthrócera filipéndulæ, and, in one instance, Cýnthi*a* cárdui, but particularly Hippárchi*a* Galathè*a*. The common white butterflies (Ponti*a* brássicæ and ràpæ) appear to be free from this pest; at least, I have not been able to detect a single *A´*carus on any one of the numberless individuals of those species which I have examined for that express purpose. It is no uncommon occurrence, to see the small blue butterflies (Polyómmatus I´carus and Adònis) flying about, as it should seem, with perfect ease and indifference, and apparently in full enjoyment of life, while some half dozen of these *A´*cari are adhering to them, and deriving sustenance from the juices of their slender bodies. If *we* were to be encumbered with vermin of a proportional magnitude, it would be like having a number of creatures as large, perhaps, as moderately sized lobsters sticking to our flesh, and preying upon our vitals. Perhaps some of your correspondents may be able to throw more light on the history of this little insect. It would form, I may suggest, a fit subject for the exercise of our friend Mr. Westwood's microscopic acumen. How, for example, does the *A´*carus first gain a lodgement on the Lepidóptera it infests? And how is the race continued after the butterflies die in the autumn? Is the insect most generally found to abound in chalk districts? &c. &c. I may observe, that, in the autumn, the *A´*cari had nearly disappeared from the butterflies, long before the latter had ceased to fly abroad.

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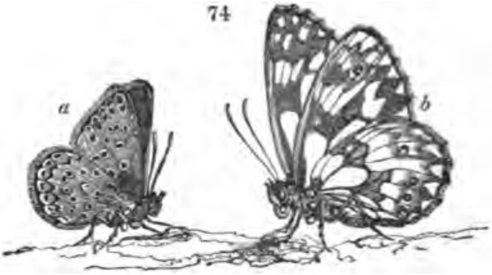

It may be proper to add, that, of the specimens of *A´*cari which I send herewith, some have been gummed on paper, in order the better to exhibit them, and others have been fixed by the same means in their natural position, just as they red to the butterflies on which they were found: in the latter case, many of the *A′*cari had made their escape before the gum could be applied; and in both, it should be remembered that the specimens have, of course, shrunk in size since they were alive. I am, Sir, yours, &c.

Dover, Sept. 30. 1831. W. T. Bree.

Some of the insects were in a paper, others inside a dry phial, and the remainder adhering to the bodies of Polyómmatus I′carus (*fig.* 74. *a*), Hippárchi*a* Galathè*a* (*fig.* 74. *b*), and Hippárchi*a* Janìr*a*, which has been deemed too common to figure. Mr. Sowerby, in making the drawings, observed that the *A′*cari out of either the phial or the paper had long bristly legs, while those taken off the bodies of the butterflies had smaller, and smoother, and less obvious legs. *Fig.* 75. represents a magnified figure of one of the latter, which Mr. Sowerby regrets is less accurate than it should be; as, from the insects coming to him in a dried and shrivelled state, the parts were discernible far less perfectly than they would have been had the insects been preserved in spirits. — *J. D.*

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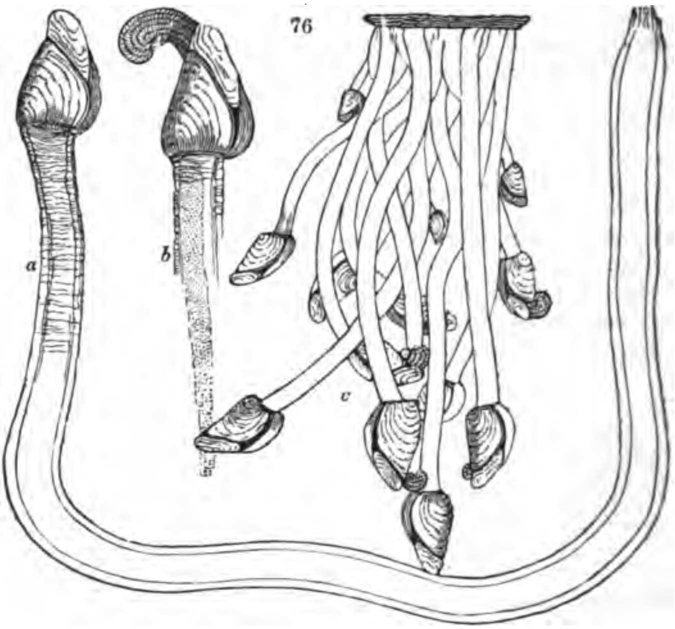
Art. IX. *Remarks on a Species of* Lèpas *cast ashore near Liverpool on Nov.* 7. 1831. By Thomas Weatherill, Esq. M.D.

Sir,

I have been a subscriber to your Magazine from its commencement, but have not observed in it any notice of the genus *Lè*pas, or acorn-shell. Perhaps the following rough sketch of a species of this family of curious creatures may be acceptable to your readers. *Fig.* 76. *c* is intended to represent a piece of wood, with a number of them attached to it, which was taken from a large log of pine found upon the shore, near Liverpool, on the 7th of November last, during a heavy gale, and a tremendous sea from the north and west.

The log, which was about 12 ft. long, and of a proportionate thickness, and apparently the remains of a wrecked vessel, was completely covered in every part with them. It excited a great deal of curiosity, and was publicly exhibited in Liverpool as a rare and wonderful marine production.

The books which I have consulted for information contain but very indefinite and unsatisfactory descriptions of the genus *Lè*pas, and what they do contain is so little and so



imperfect, that I have not been able to assign the present specimen to any of the species they mention. The goose-bernacle (*L*èpas *a*natífera, *fig.* 77. p. 343.) approaches the nearest, and it may be a variety of it. I am almost, however, inclined to consider it a new species. The genus *L*èpas belongs to the order *V*érmes testàcea [worms in shells]; shell multivalvular, or of many valves, unequal, sometimes fixed by a pedicle or stem, and sometimes not. Animal, a triton, with tentacula. The species *a*natífera consists of five-valved shells, irregular, somewhat depressed, affixed to a pedicle, and in clusters; colour, a reddish purple, which runs into a dark brown purple near the base of the shell. The one under consideration has a shell of five valves, irregular, depressed, attached to a stem, but not in clusters; every shell having its own pedicle, which is perfectly transparent, and nearly colourless, inclining slightly to a reddish purple as it approaches the shell, and then assuming a darker purple colour, which gradually grows deeper until it reaches the base. Hence it differs from the *a*natífera in two very marked particulars: — 1st, By having undivided and much longer stems; and, 2dly, by having a much less dense colour.

Fig. 76. *a* is about the ordinary length and size of those cast on shore in November last. The stem is represented to be composed of two envelopes: this, on a cursory view, does not appear to be the case. To detect the inner coat, a minute examination is necessary; but if macerated a few days, the two become very apparent. There is a space between the two coats which gradually decreases in volume towards the caudal extremity, where it is entirely lost. This space was occupied by a fluid of a different nature from that found within the inner envelope; it consisted of a jelly, or mucus-like substance, a rete mucosum [a mucous membrane of a net-like structure], in which was contained the colouring matter of the animal. The outer envelope, or epidermis, was finely attenuated, and most beautifully transparent; externally, it was plentifully bedewed with a watery moisture; the inner, or cutis, was much thicker, less transparent, and appeared of quite another texture; by the assistance of a common magnifying glass I discovered it to be fibrous, the fibres running in all directions, but the strongest in parallels towards the extremities; hence I believe this coat to be muscular. This fact seems also to be borne out, from the animal having the power of extending, shrinking, and writhing itself at pleasure. Nearer the shell these fibres are obvious to the naked eye, the coats become rugose or corrugated, the rete mucosum of a much darker hue, and the contractile power of the animal is greater here than in any other part.

Fig. 76. *b* shows the shell opened, with the tentacula exposed. The animal moves these appendages with great facility and quickness: and they serve, no doubt, the purpose of seizing its food; but I think it very likely that they are also its principal respiratory organs. Each tentaculum consists of many joints, which are supplied with papillæ [pimples], or elevated pores, arranged transversely; every joint has three papillæ, two lateral and one in the centre; from each springs a hairlike appendage, which the animal has the power of rotating in all directions, in a manner nearly imperceptible to the bystander.

The inner coat likewise of some of these creatures, as seen in *fig.* 76. *b*, contained numerous very small round bodies, attached to one another by cellular tissue of the finest texture imaginable, and the whole was defended by an envelope of a similar delicate structure, extending to nearly one third of the animal's length. Each of these minute bodies, or ova (for they are probably the rudiments of future offspring), was surrounded by a bag containing rete mucosum, of a bluish purple, in a quantity sufficient apparently to suspend the ovum.

The habits and economy of the *Lèpas* family appear to have been but very imperfectly studied; they are spoken of, and variously represented, by Gerarde and others of olden times; their descriptions, however, are clothed with little else than folly and superstition, and therefore it necessarily follows, that what is drawn from them is wrapped up in doubt and uncertainty.

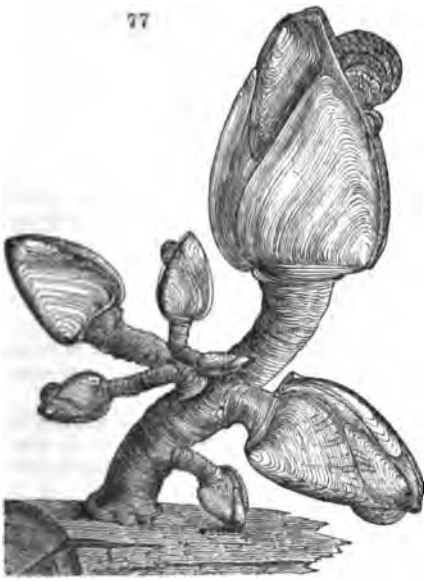
I should be glad to obtain further information concerning this genus from some of your correspondents, in an early Number of this Magazine.

I am, Sir, yours, &c.
Liverpool, Dec. 1. 1831. THOMAS WEATHERILL, M.D.

NOTWITHSTANDING the perfect justice of Dr. Weatherill's objection to the older histories, on account of the absurdities blended with them, some of these are too amusing to be at once and wholly repudiated. On this plea, and as indicative of the historical progress of the knowledge of natural objects, we hope to stand excused for presenting the following remarks on the barnacle shell. Our first quotation is from Hall's *Amulet* for 1830, and occurs in a historical essay therein, entitled "The First Invasion of Ireland; by the Rev. Robert Walsh, L.L.D."

"The Bay of Bannow abounds with sea fowls, and amongst them is one [the bernacle goose, *A'nser Bérnicla* Willughby] which has been the occasion of very extraordinary opinions. It is a bird resembling a wild goose, and is found in abundance in this bay, and also in that of Wexford. It feeds on the tuberous roots of an aquatic grass, which is full of saccharine juice; and, instead of the rank taste of other sea fowl, which feed partly on fish, this bird acquires from its aliment a delicate flavour, which renders it highly prized. But the circumstance which long made it an object of the highest curiosity was an idea that it was not produced, in the usual way, from the egg of a similar parent; but that it was the preternatural production of a species of shell-fish called a barnacle. This singular absurdity is not to be charged to the Irish: it was first published to the world by Giraldus Cambrensis, who accompanied the early invaders, and saw the bird in this place. It was received with avidity in England, and set down among other attractive wonders of the new and barbarous country, where every thing was wild and monstrous. The shell supposed to produce it, is found on this coast, adhering to logs of wood, and other substances, which had remained long in the sea water: it is attached by a fleshy membrane at one end, and from the other issues a fibrous beard, which curls round the shell, and has a distant resemblance to the feathers of a fowl; and on this circumstance the story was founded. So late as the time of Gerarde, this was firmly believed by the naturalists in England. In a folio edition of Gerarde's works [Johnson's edition of Gerarde's *Herbal*, 1636, p. 1587, 1588.] there is a long account of this prodigious birth, which he prefaces by saying—'What mine eyes have seen, and mine hands have touched, that I will declare;' and he accompanies his description with a plate, representing one of these birds hanging by its head to a barnacle shell, as just excluded from it, and dropping into the sea. The fishy origin of the bird rendered it also an object of ecclesiastical controversy. It was disputed with much warmth in England, before the Reformation, that this Irish bird, having a fish for its parent, was not properly flesh, and that it might be eaten with perfect propriety on fast-days; and hence this delicious meat was an allowed luxury, in which many worthy ecclesiastics concientiously indulged in Lent. One learned man made a syllogism to defend his practice:—'Whatever is born of flesh is flesh; but this bird has no such origin, therefore it is not flesh.'* Another retorted on him by the following ingenious position: — 'If a man,' said he, 'were disposed to eat part of Adam's thigh, he would not be justified, I imagine; because Adam was not born from a parent of flesh.' † So universal, however, was this belief in the extraordinary origin of this bird, that its supposed parent, the shell-fish, is called, by conchologists, at this day, *Lèpas* *a*nsífera, the goose-bearing lepas."

A word may here be offered on the two specific epithets *a*nsífera and *a*natífera. As the *Lèpas* was supposed to produce a goose, *a*nsífera (goose-bearing) would seem the fittest epithet; but *a*natífera (duck-bearing) seems the one most frequently and almost invariably applied. Turton, accordingly, in his translation of Linnæus's *Systema Naturæ*, affixes to the *Lèpas* *a*natífera, as its English name, "Duck bernacle." See vol. iv. p. 169. of the translation mentioned. Professor Rennie, in his recent edition of Montagu's *Ornithological Dictionary*, gives, under the head "Bernacle goose," p. 31., a somewhat detailed account of the anserine associations appertaining to the *Lèpas* *a*natífera; and notices most or all of the old writers who have written on, reported on, or credited, so marvellous a matter. From Gerarde's account, as quoted by Professor Rennie, we learn, that, in Gerarde's time, *Lèpas* *a*natífera, or, at least, some one species, was not rare on the coast of Lancashire; and also that the bernacle, brant, or tree goose, was there also so abundant, "that one of the best is bought for threepence." Dr. Drummond, too, introduces the *Lèpas* *a*natífera, with the appended, apparently well-executed, figure (*fig.* 77.), but essentially distinct in its branched pedicel from the figure given above, into his excellent *Letters to a Young Naturalist*, p. 162—165. From his account we learn, what perhaps is not stated with sufficient clearness above, that the pedicel is fleshy and contractile. From Dr. Drummond's quotation from Gerarde it appears that the *Lèpas* *a*natífera, or some one species, was, at the commencement of the seventeenth century, not rare on the coast of the north of Scotland and of the Orcades.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Of the *Lèpas* *a*natífera, a figure has been previously given (Vol. I. p. 29.), but grouped with genera and species of molluscous animals inhabiting shells: nevertheless, for the sake of making our history and illustration of the pedunculated *Lèpas* as complete as our means will enable us, the cut is here repeated. (*fig.* 78.) It will be right to quote here, also, a remark expressed by G. J. (Vol. III. p. 335.), in his fifth letter on Molluscous Animals; it is this: — "We do not include the Cirrípedes (*Lèpas Lin.*) amongst the Mollúsca." — *J. D.*

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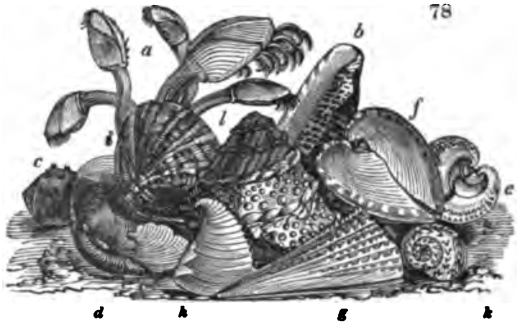
* "Quicquid est caro ex carne communi naturæ cursu gignitur;
Ast talem ortum Bernaculæ non habent:
Non sunt igitur Bernaculæ carnes." — *Stanihurst.*

† "Si quis enim ex primo parentis, carnei quidem licet de carne non nati, femore comedisset, eum a carnium esu non immunem arbitrarer." — *Cambrensis.*

a, *Lèpas anatífera.*



b c d, Veiled Shells. *e f*, Cockles. *g*, *Pínna frágilis.* *h*, Carinària vítrea.
i, Vènus Chlone. *k*, *Nerìta canrèna.* *l*, *Tròchus.*

ART. X. *Illustrations in British Zoology.* By GEORGE JOHNSTON, M.D., Fellow of the Royal College of Surgeons of Edinburgh.

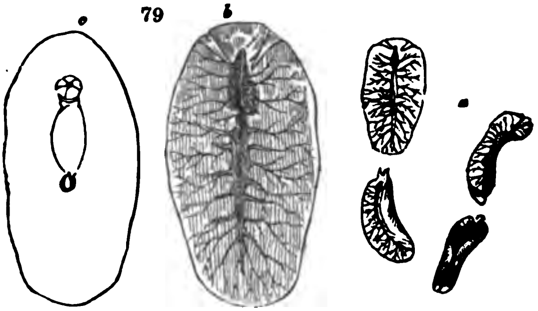
3. PLANA'RIA CORNU'TA. (*fig.* 79.)

Cl. *Vérmes*, Ord. Mólles, Fam. Planulàriæ, Gen. Planària.

Pl. — Ovàlis, plana, foliacea, venosa-rubescens, lineâ saturatiore in medio notata, atomisque albis irrorata; tentaculis duabus; ocùlis plurimis in maculâ dorsali acervatis.

Pl. — Oval, flat, thin, reddish-brown, the colour disposed in veins, marked with a blood-red line down the middle, and sprinkled over with white dots; tentacula two; eyes very numerous, forming a black spot on the anterior part of the back.

Habitat. The sea-coast of Berwickshire.



a, Animal of the natural size, and in different attitudes. *b*, Animal magnified.
c, Ventral surface, to show situation and form of proboscis, and of posterior aperture.

Desc. — Body oval, flat, thin, soft, the margin plane; length about three fourths of an inch; the breadth about one half the length. Dorsal surface reddish brown, freckled with white dots; the brown colour disposed in vein-like ramifications, very distinct towards the sides. In front there are two conical tentacula, about one eighth of an inch long, furrowed on the ventral aspect; altogether marginal, darker-coloured at the bases, from numerous very minute black dots. About a line behind the tentacula there is an oblong black spot, divided into two equal halves by the mesial [middle] line: this spot is pointed in front, truncate posteriorly, and is formed by a multitude of dot-like eyes clustered together. The mesial line itself is of a red or blood colour, but does not reach to either extremity. Ventral surface also reddish-brown, but lighter; marked in the middle with an oblong white space, produced by the retracted proboscis, which is short, white, thick, exsertile, with a terminal wide and unarmed aperture. Behind the spot produced by it there is another small pore, but whether an anus or sexual orifice is uncertain.

The red line which runs along the centre of the back is evidently an alimentary canal; and the vessels which ramify through the body, and on which the colour of the worm depends, appear to arise from it, and are probably intended to convey the nutritive fluid directly to the different parts. There is no appearance of any sanguineous system, but the vessels just mentioned are branched in a somewhat dichotomous manner, particularly towards the sides; for they do not reach the margin, neither do they seem to anastomose freely. Their form and disposition are well expressed in the magnified figure.

Planària cornùta is a new acquisition to the British fauna. It inhabits the sea on the coast of Berwickshire; where it resides in deep water, and is, consequently, only to be found occasionally creeping on corallines and shells brought up by the lines of the fishermen. It progresses by a sliding continuous motion; and, for a worm, its progress is not slow. When in motion, the tentacula are generally erect or reflected backwards; it often moves on the side, with the ventral surface half everted; and sometimes both sides are turned up, so as almost to meet. It dies soon in a vessel, although filled with sea-water; and, towards its close, will frequently project the proboscis, or even detach it entirely in the struggle. But, though separated, this part retains its irritability for an amazing length of time. On the evening of the day on which a fine specimen was brought me, I left it, lively and healthy, in a saucer of sea-water; but next morning it was found dead, and the proboscis lying at some distance. Fully twenty-four hours elapsed before I could examine it farther, when, to my astonishment, the proboscis was seen to contract and dilate its aperture with energy; yet the body itself had softened, and could not be lifted even on a hair pencil.

Planària cornùta was discovered by Müller; but I know his animal only through the short and imperfect description given in Dr. Turton's translation of the *Systema Naturæ*, vol. iv. p. 65. There are some discrepancies between it and mine; but I think the characters in common are sufficient to show the identity of the species. Still I shall feel indebted to any one of your readers who may have access to the *Zoologia Danica*, if, by a comparison of the figures, he shall confirm my synonyme, or prove that it is erroneous.

I am, Sir, yours, &c.

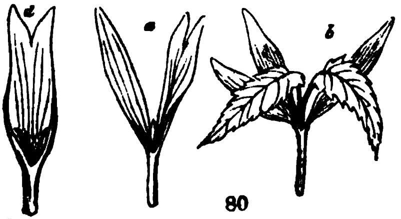
GEORGE JOHNSTON, M.D.

Berwick upon Tweed, Jan. 28. 1832.

ART. XI. *On Variations in the Cotyledons and Primordial Leaves of the Sycamore* (*A'cer Pseùdo-Plátanus* L.). By the Rev. J. S. HENSLOW, A.M., King's Professor of Botany in the University of Cambridge.

Sir,

THE number of cotyledons in coniferous plants is well known to be very variable, and the seeds of some other dicotyledons have likewise been observed occasionally to possess more than two. The sycamore (*A*cer Pseùdo-*Plá*tanus *L.*) is a good example of this fact; and a careful search among the numerous young plants which every where spring up in the neighbourhood of this tree, has afforded me many specimens in which the cotyledons were either three or four in number. In some instances, where there were only two as usual, one of them was more or less cloven down the middle (*fig.* 80. *a*); and these served to illustrate, in a marked manner, the way in which others had become possessed of more than their ordinary number. For in these cases either two of the cotyledons were not at first so large as the third, when there were three only (*b*); or else, when four were present, they were all proportionably smaller than in those plants which bore two



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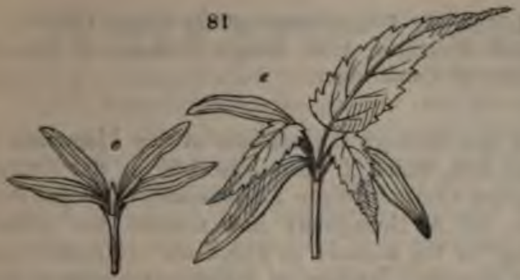

(*fig.* 81. *c*). This shows that the multiplication of the cotyledons in some plants may be the result merely of a subdivision in the two which belong to them in their normal condition, and that it may not have originated in any supernumerary developement of these organs themselves. Their comparative inequality, however, soon ceases as the plant developes itself. In one instance I have remarked a cohesion taking place between the two cotyledons nearly throughout their whole length (*fig.* 80. *d*), and then the young plant had strangely assumed the form of a monocotyledon. Sometimes the superfluous division was continued to the primordial leaves, of which there was one large, and two that were smaller (*fig.* 81. *e*): but I have never observed this anomaly extend beyond them: the next in succession, and all after them, being developed in pairs in the usual way. The above figures are selected from among several varieties which I possess of this anomalous germination of the sycamore.

I remain, Sir, yours, &c.

Cambridge, Feb. 2. 1832. J. S. Henslow.

VERY interesting, even under ordinary circumstances, are the seed-vessels, seeds, and germination of the seeds, of that free-growing, broad-leaved, umbrageous tree, the sycamore. The samaras (winged capsules) are usually produced in pairs, rarely in threes; in every three which I have met with, the seed (for every capsule usually includes but a single seed) within the third samara has been imperfect. The funiculi, or umbilical cords, are to be traced with easy obviousness in their passage through the base of the samaras, and to their union with the seed's own proper envelopes. Admirable, too, is the neat and copious lining of soft and glossy down, with which the interior of the cell of the samara is coated, to lodge the seed commodiously, till winds have acted on the wings of the capsules, and disseminated them, and the moisture of the earth whereon they fall has, by its stimulus, excited the seeds they contain to germinate. "Cotyledons folded" is, in *English Flora* (vol. ii. p. 230.), a generic character of *A'cer*; in *A'cer* Pseudo-*Plátanus*, the sycamore, they are circinately so, and incumbent on the radicle *: the chewed cotyledons and primordial leaves are bitter to the taste. — *J. D.*

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* The earlier an error is noticed the better. Of *Crámbe maritima* it is remarked in *English Flora*, vol. iii. p. 184., "Cotyledons accumbent, not

Art. XII. *On the Fructification of the Genus* Chàra. By the Rev. J. S. Henslow, A.M., King's Professor of Botany in the University of Cambridge.

Sir,

Allow me, through the medium of this Magazine, to state a curious fact, which I once observed in the fructification of the genus *Chàra*. In the *Dictionnaire Classique d'Histoire Naturelle*, M. A. Brongniart has noticed the difficulty of accounting for the manner in which the red matter contained in the "globule" (anther of Linnæus) becomes dispersed. At a certain season of the year this part of the fructification is found empty, but its outer surface does not appear to have been ruptured. It is quite contrary (as he remarks) to all analogy, for us to suppose the included matter to have passed into the "nucule" (germen of Linnæus), through the internal substance of the plant. The fact, however, to which I am about to allude, seems to show that this is nevertheless the case. At all events, I think it is well worthy of being recorded, in order that others may direct their enquiries by the additional light which it appears to me likely to throw upon this subject.

A variety of the *Chàra vulgàris*, which grows in a running stream at Coton near Cambridge, is more highly incrusted with carbonate of lime than any specimens which I have elsewhere met with. Considerable masses of it may be dug out in the form of a loose porous stone. It was in some specimens of this variety, gathered on Nov. 3. 1830, that I met with many globules which had become white from having parted with their red matter, whilst the nucules had assumed a reddish tinge, doubtless from their having imbibed the same. Among these nucules I noticed a few in which the outer surface appeared to be spirally banded with alternate lines of red and white. (*fig.* 82.) The outer coat of the nucule consists of five tubes spirally twisted together, and the ends terminating in a sort of crown upon its apex. The banded appearance here described arose from some of these tubes being charged with the red matter, whilst the others were empty. Unfortunately, I could not at the time command sufficient leisure

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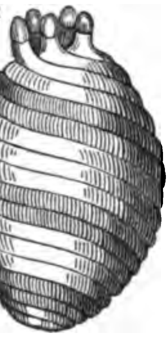

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as in De Candolle's general table [*Systema Regni Vegetabilis*, vol. ii. p. 146.] incumbent." Examination will prove them incumbent and conduplicate, and De Candolle correct. — *J. D.*

to examine this singular phenomenon with the minute attention which it deserved; but I made a rough sketch of the appearance, intending on some future occasion to renew my observations. I have, however, since sought in vain for fresh examples; and, as I think it possible that the appearance may have originated in some accidental obstruction in the tubes of these specimens, preventing the passage of the red matter through some of them, I wish the fact to be made known at once, in order that others may have their attention called to the subject, and not neglect an opportunity, should they chance to meet with one, of examining a phenomenon, which seems so likely to afford us further insight into the real character of the fructification of these plants.

The fact which this appearance seems to me to establish is, the internal passage of the red matter from the globule to the nucule, affording us a strong point of analogy between this genus and the *Confèrvæ* conjugàtæ; an analogy, however, which has not been overlooked in the general structure of the plants themselves. How the red matter passes from the outer coat to the inner chamber of the nucule is not so apparent; unless we may suppose it to be effected through certain minute connecting processes, detected in the fossil species of this genus, figured by Mr. Lyell in the *Geological Transactions* (new series, vol. ii. pl. 13. fig. 2.). I have found, upon opening some nucules which had fallen from the plant, that they were filled with perfectly smooth spherical grains of considerable size, and of a reddish tinge; and that these grains were composed of a congeries of minute granules. These grains are, probably, what some observers have imagined to be seeds, and who have in consequence described the nucule as a polyspermous capsule; whilst others, who have seen that each nucule produces only one plant, have considered these grains to be of an alimentary nature, prepared for the purpose of nourishing the young plant during the early stages of its germination. If we were to allow that any analogy exists between the *Chàræ* and phænogamous plants, the globule would rather seem to represent a single naked grain of pollen than an entire anther, as it has been usual to consider it: but in our present ignorance of what are the actual functions of this organ, it is perhaps safer to class this genus with the Cryptogàmia.

I am, Sir, yours, &c.

Cambridge, Feb. 2. 1832. J. S. Henslow.

To the charas another very interesting consideration appertains: for within their pellucid stems, when inspected through a powerful microscope, the motion of the sap, in its course of circulation, is as obvious as the current of a river. I had the pleasure to witness this, as had several others, at the Linnæan Society's meeting on the 6th of March, 1832. Richard Horsman Solly, Esq. F.L.S., whose intimate knowledge of vegetable physiology and anatomy Professor Lindley has recently taken occasion to attest, when ascribing to a new genus in Pittospòreæ the name of Sóllya, was the gentleman who had provided this exquisite spectacle for the gratification of all who chose to inspect it; and delightful it was to see the sap, in the shape of a thousand air bubbles, dancing briskly up on one side of the chara's stem, and descending in the same lively manner on the other. The specimen inspected appeared to be an internode of a stem of *Chàra*, bounded by a joint at top and another at bottom: it was erect; and, I believe, in a vial filled with water, on the back of which the light of a wax candle, deprived of its glare by the interposition of Varley's dark chamber, was thrown, while the inspector viewed it from the front. Mr. Solly obligingly changed the object into various points of view, by each and all of which one remarkable fact was clearly apparent; namely, that the process of circulation was not taking place about the whole periphery of the stem or internode, but in two broad opposite lateral longitudinal bands, which effect left two also opposite lateral longitudinal bands unoccupied by any process of circulation. I find, by a communication subsequently published in the *Gardener's Magazine*, vol. viii. p. 143., that Mr. Burnett, of King's College, had, as early as the 17th of January, 1832, exhibited the same interesting spectacle, and apparently before the members of the Medico-Botanical Society; and from the communication cited I quote as follows: — "The course of the sap in *Chàra* is so far ascertained, that Mr. Burnett thinks himself justified in declaring that each joint or limb has an individual circulation; and although it may have a communication with other joints, yet that its motion is complete in itself. A section of a rootlet, or of a joint, shows it to consist of two lateral, simple, semilunar ducts, each being the channel of a current that traverses the root or joint in an opposite direction to the other; the course of the one being up, the other down. These ducts, although not spiral in their structure, that is, not spiral vessels, are spiral in their disposition, being twisted as it were round a central axis, and forming two separate scalæ, much in the same way as the 'wild worm' is often scored [by gardeners, who give to their scorings the term of wild worm] round the stems or branches of unfruitful trees." I may add, that, in the specimen exhibited by Mr. Solly, the spiral direction of the opposite scalæ or ducts was so progressive, that, although perceptible, it was not very obvious. If the spiral bands so striking on the outer coat of the nucule (*fig.* 82.) are but a modified continuation of the structure which obtains in the stem, the strong spiral curvature exhibited in the nucule may perhaps be accounted for by remembering the concentration of structure which plants, in their organs of fructification and reproduction, very frequently manifest. — *J. D.*

ART. XIII. *Observations made in the Neighbourhood of High Wycombe, Bucks, on the Temperature of the Atmosphere, on the Rain and the Winds, of the Months of June and July, during the last eight Years, and on the Influence of these Meteorological Phenomena on human Health.* By JAMES G. TATEM, Esq., Member of the London Meteorological Society.

Sir,

AFTER a summer like the past, when sickness so generally and so alarmingly prevailed, it may be neither uninteresting nor unprofitable to examine into the state of the weather, as indicated by the usual instruments; and to compare the results with those of similar observations, made in the same period in former summers.

To effect this, I have prepared the following tables, showing the greatest elevation and depression, together with the means of the thermometer and barometer; the quantities of rain; and the number of days on which the wind blew from the cardinal and semi-cardinal points of the compass, in the months of June and July, for the last eight years. Under the *means* I have placed the observations for the present year, by which the deviations are immediately perceived.

Table of the Thermometer and Barometer.

Year.	Thermometer.			Barometer.		
	Highest.	Lowest.	Mean.	Highest.	Lowest.	Mean.
1823	72·50°	34·50°	55·17°	30·07	29·06	29·60
1824	78·	35·50	55·555	30·24	28·96	29·68
1825	89·	32·50	57·01	30·10	29·09	29·80
1826	86·	39·25	60·01	30·20	29·41	29·835
1827	79·75	34·	56·85935	30·16	29·33	29·75421
1828	76·	39·	57·5098	30·07	29·07	29·57875
1829	74·50	34·50	55·41703	30·14	29·02	29·65962
1830	82·50	35·	55·98931	30·08	29·14	29·62375
Mean	79·78°	35·53°	56·69006°	30·13	29·13	29·69141
1831	78·50	39·	57·18598	30·09	29·32	29·71216

Table of the Rain and Winds.

Year.	Rain in Inches.	Winds.							
		N.E.	E.	S.E.	S.	S.W.	W.	N.W.	N.
1823	7·45125	2	—	—	13	22	22	2	1
1824	4·27000	7	8	3	5	9	17	3	9
1825	1·93125	11	3	4	2	14	10	5	12
1826	1.46250	6	5	2	7	12	6	13	10
1827	3·39370	2	8	2	3	23	13	8	7
1828	7·28750	6	3	5	9	17	11	9	1
1829	8·36250	7	3	6	5	20	4	11	5
1830	6·57350	4	2	6	5	22	11	9	2
Mean	5·08527	5⅝	3⅞	3½	6⅛	17⅜	11¾	7½	5⅞
1831	5·21875	2	4	—	—	19	12	14	10

Thus it appears that the range of temperature, for the time, was less than the average; while the *mean* was higher by half a degree. The same observation applies to the range of the barometer; but the mean of that instrument, as it will be seen, was very near the one calculated. In the quantity of rain only a very trifling difference is observable; and the greatest deviation from the table is in the number of days on which the wind blew from the north and north-west; which, this year, was nearly double the average numbers. Another and more distinguishing feature of the period in question was the high state of electricity of the atmosphere: thunder was heard seven times, and, in three or four instances, was extremely loud, and the lightning very vivid; which is unusual in this neighbourhood, where severe storms are rarely experienced.

That atmospheric changes have great effect on the human frame, there are few, in those days of general information, who will venture to deny. One of the symptoms attending the epidemic in this neighbourhood, which claimed attention, was inflammation of the lungs. Might not this have been partly occasioned by the excess of the electricity floating in the air acting as a stimulant? But the meteorologist must confine himself to making observations, and affording data for the speculations of those whose habits and studies enable them to theorise with more effect, and with better prospects of success; while the physiologist may form opinions as to the effects peculiar states of the air may have on the people living beneath its influence.

It was under these impressions that I applied to a respected friend, of long experience and extensive medical practice in this neighbourhood, through whose kindness I am enabled to add the following remarks: — "That the influenza which appeared in this vicinity had in a great measure resembled in its symptoms those of former periods, viz. 1762, 1775, 1782, and 1803, when prevailing as an epidemic. At the commencement, catarrhal and peripneumonic symptoms were most observable, during which time north-westerly winds prevailed; afterwards, inflammatory affections of the brain and its membranes became the more prominent character of the disease, in some instances complicated with peripneumonic symptoms; but these were confined to low situations, while, in those more elevated, the peripneumonic complaints were unattended by affections of the sensorium. The fatal cases were those in which the brain was affected, and the greater proportion of them persons advanced in life. Any speculation upon the cause of such extensively prevailing disease as has been witnessed would be at present but hypothetical; and whether it was occasioned by atmospheric influence, or some specific malaria, it must be candidly confessed, is at present, 'hidden from our eyes.'"

From the above judicious remarks of my medical friend, it would appear that there might probably be two causes for the epidemic: the one having effect in the lower places, which, perhaps, was malaria; and the other, acting with greatest effect on persons living in higher situations, and more exposed to atmospheric influence. On the supposition that the cases of inflammation of the lungs were occasioned by the quantity of electricity which prevailed, its effects would be widely extended, as we find to have been the fact; and, when combined with the malaria, is it too much to conjecture that it produced the affections of the brain?

It is with the view of rendering meteorology subservient to the most important science that can occupy the mind, that I have presumed to call the attention of your scientific readers to the subject: — "Homines enim ad deos nulla re propius accedunt, quam salutem hominibus dando." [Men resemble the Deity in nothing so much as in doing good to mankind.]

I am, Sir, yours, &c.

Wycombe, Bucks, Nov. 30. 1831. James G. Tatem.

Art. XIV. *Notes on the Weather, in Switzerland, during May, June, July, and August,* 1831; *and at Rome, during Nov. and Dec.* 1831, *and Jan. and Feb.* 1832. By W. Spence, Esq.

Weather in Switzerland.

Sir, I now send you the results of some rough notes which I have kept of the weather during a four months' residence, this present summer, in Switzerland; conceiving that, like my similar imperfect accounts of the last two winters at Florence and Pisa, they may possibly be acceptable to some of your meteorological readers who have not access to more exact details. From May 1. to July 11. were spent at Geneva; from July 12. to 17. at Lausanne; and from July 19. to Aug. 31. at Berne.

I am, &c.

Berne, Sept. 5. 1831. W. Spence.

	May.	June.	July.	Aug.
Mean height of the thermometer at 8 A.M.	55°	61°	63°	59°
Days of sunshine throughout	8	14	16	8
—— partially sunny and fair	7	5	2	9
—— cloudy and fair	1	—	3	—
—— rainy	15	11	10	14

Heat. — The highest point to which the thermometer was observed to ascend in May was 74° on the 26th; commonly it ranged from 63° to 67° on days more or less sunny. On the 15th, 20th, and 21st of June it reached 80° and 81°; and on six days it exceeded 75°; but in general, when the sun was out, did not rise higher than from 70° to 75°, during June, July, and August, and, in these months, was often below 70° at 1 and 2 P. M.

Rain. — The quantity of rain has been excessive. With the exception of three weeks, at distant periods, of continued sunny weather, viz. from the 15th to the 20th of May, from the 1st to the 7th of July, and from the 21st to the 27th of August, there have never been, during the whole period, more than three or four fine days in succession. The rain was often heavy, and long-continued; but by far the greatest quantity fell on Monday and Tuesday, the 8th and 9th of August, when it poured in torrents, for upwards of 48 hours, over the greater part of the middle and east of Switzerland, causing dreadful inundations, and sweeping away bridges, houses, and cattle.* The lakes of Thun and Brientz, which together are about 20 miles long and from 1 to 2 broad, were raised 2 ft. in height by the torrents which poured into them from the mountains, and flooded the intermediate valley of Interlaken; and a similar increase took place in the Lake of Lucerne: while, on the same day, water-spouts fell on various parts of the Cantons of Zurich, Argau, Schaffhausen, &c., doing greater and more general mischief than for many years. The rain was accompanied by lightning and thunder, on three days in May, on one in June, on three in July, and on four in August. The heavy and continued rains, lasting for a day or longer, were almost always ushered in by a thunder-storm: this was the case with the deluges which fell on the 8th and 9th of August.

Hail. — At Lausanne, on the 14th of July, about 8 P. M., we witnessed one of those hail-storms which, every summer, cause such ravages in the south of Europe. A great proportion of the hailstones were as big as hen's eggs, and some even bigger: seven nearly filled a common dinner plate. They were mostly oval or globular; but one piece, brought to us after the storm, was flat and square, full 2 in. long, as many broad, and three quarters of an inch thick, with several projecting knobs of ice as big as large hazel nuts. This mass exactly resembled a piece of uniformly transparent ice, but the oval and globular masses had the same conformation as has often been described in these hailstones, and on which

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* It appears from the journals that the rains of the 8th extended into the neighbouring departments of France, and in the district of Epinal destroyed the whole harvest, causing a loss estimated at 400,000 francs.

Volta founded his ingenious but untenable theory of their formation. In the centre of each was a small white opaque nucleus, the size of a pea, and evidently one of the hailstones usually seen in England, to which the French give the name of *grésil*, confining the term *grêle* to the larger masses of ice now under our observation. This nucleus of *grésil* was enclosed in a coat about half an inch thick of ice considerably more transparent than it, but still somewhat opaque, as though of snow melted and then frozen again, and externally the rest of the mass was of ice perfectly transparent, and as compact and hard as possible, resounding like a pebble, and not breaking when thrown on the floor. The inhabitants of Lausanne, aware that the cinereous and puffed up appearance of the clouds charged with this tremendous aerial artillery portended more than a mere thunder-storm, had adopted the precaution of closing their Venetian shutters; but such windows as were deprived of this protection had almost every pane broken: and much damage was done to the tiles of all the houses, and to the gardens and vineyards *; but less than might have been expected, owing to the short duration of the storm, which did not last longer than seven or eight minutes, and to the circumstance of the hailstones not being very numerous.

Moisture. — It might be expected that, in so wet a summer, the air would be saturated with moisture; and, from comparative observations on those natural hygrometers which every where present themselves, I am persuaded that more moisture existed in the air at Geneva during the month of May, than at Pisa in the month of December, which was even more rainy. I am ignorant how far the summers generally may deserve the same character as the present one; but that, in winter, the air in Switzerland is considerably drier than in England at that season seems proved by the fact, that one of my friends at Berne keeps, during winter, his orange and myrtle trees, laurustinuses, pomegranates, fig trees, and various other plants, in a cellar lighted only by three small windows, which are opened occasionally in fine weather, but are entirely covered with straw during all the hard frost; so that the plants must be in total darkness great part of the long winter, during which, from the beginning of November to the end of April, they are placed in this subterranean greenhouse. Under similar treatment, I apprehend that, in most winters in England, orange trees and other evergreens would have their leaves destroyed by mould; and would be so materially injured as to display, in summer, a very different appearance from that of my Berne friend's plants, which attracted my attention, in his garden, by their remarkably vigorous and healthy aspect. Both during the present and last summer, which was much drier, I have seen nothing in Switzerland of that clearness of the atmosphere, of which some tourists speak; the same haziness being in a greater or less degree observable, which is usually complained of in England. The distinctness with which the Alps may be often seen at the distance of 40 or 50 miles proves little, as they may be sometimes plainly seen even when the atmospheric haze is so great that the sun can scarcely pierce it. This I have more than once observed, and I have no doubt that mountains of as great height, and similarly covered with snow, would be as distinctly seen, at the same distance, through an English atmosphere. Whether the Alps can be seen or not, from distant points of view which command them, depends wholly on their being themselves free from clouds, or enveloped in them; which last so often happens, that a traveller may remain at Geneva for a week, or longer, without ever obtaining a glimpse of Mont Blanc, or at Berne of the Jungfrau: and they are often thus invisible in bright clear weather, and become disclosed when a dull hazy atmosphere prevails.

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* The remarks well elucidate Dr. Mitchell's article (Vol. IV. p. 551.) on "Hail in the South of France, and Insurance against loss by it." — *J. D.*

Progress of Vegetation. — On the 1st of May, vegetation at Geneva was about as far advanced as we had left it at Pisa in the beginning of April, the leaves of oaks and ashes being but half-expanded, and only here and there hawthorn and apple blossoms out. Cherries, in small quantities, appeared in the markets about the 20th of May, and gooseberries the 25th. Most of the species of rose in the Botanic Garden in flower, June 9. Wheat in bloom, June 11., and haymaking general. Some wheat cut, July 11., in the neighbourhood of Geneva; but at Berne (which is 1708 Paris ft. above the level of the sea, while Geneva is but 1135 ft.) the wheat was not generally got in till the beginning of August, and the second crop of hay not till the middle and end of the month.

General Character of the Summer. — This has been unusually wet, cool, and variable. The Jura chain of mountains did not wholly lose their snow till the end of June. Early in August, at Berne, the evenings began to have a cool autumnal feel; and, from the 17th to the 25th of the month the thermometer was never higher than from 53° to 57° at 8 A.M., and on the 19th, after heavy rain, was as low as 51°, with very thick fogs, in the mornings, till 7 o'clock. What, fortunately, counterbalances, in Switzerland, the effects of both wet days and cold nights, as autumn approaches, is the great power of the sun when it does shine; so that, notwithstanding these drawbacks, and that the elevation of Berne above the sea is full one half that of Snowdon in Wales, fine crops of wheat, even in this peculiarly wet summer, have been here housed as early as the 5th of August.

WEATHER AT ROME.

SIR, I now enclose you a summary of my notes on the weather at Rome for the past four months, which, with the similar one that I have before sent you from Florence and Pisa, may enable your meteorological readers to compare, as far as can be done from such imperfect notices, the last three Italian and English winters. I am, Sir, Yours, &c.

Naples, March 10. 1832. W. SPENCE.

	1831.		1832.	
	Nov.	Dec.	Jan.	Feb.
Mean height of thermometer at 8 A. M. . . .	48°	43°	41°	44°
Highest point	(4th) 58°	(20.) 54°	(12.) 53°	(3.) 58°
Lowest	(29.) 33°	(29.) 33°	(25.) 33°	(18.) 36°
Days of bright sunshine	12	9	14	14
partially sunny	9	12	6	2
cloudy, but fair	1	2	2	3
rainy	8	8	9	10
Wind, north . . . . number of days	5	4	8	—
north-east	4	1	—	5
east	3	1	5	8
south-east	—	—	4	10
south	—	2	1	3
south-west	5	14	11	1
west	8	6	1	—
north-west	5	3	1	2

General Remarks—The winter, even for Rome, has been remarkably mild, without snow, except a slight fall, of an inch, on the morning of February 16., which was all dissolved before noon; or frost, other than hoar-frosts on the 4th and 19th of December, from the 21st to the 25th of January, and from the 13th to the 24th of February; and with little of violent and continued rains, which, too, when occurring, almost constantly took place in the night, so that there were not above three or four days when it was necessary to keep house, on account of the weather, the whole winter; by far its larger portion resembling the finest parts of an English April; the thermometer being seldom below 40° at 8 in the morning, and up to 55° and 60° in the middle of the day. The most wintry days were from the 13th to the 18th of February, which were cold and rainy, with one slight shower of snow, and a good deal resembled the raw days of an English November. A very high wind from the south, on the 2d and 3d of February. Lightning and thunder on the 18th of November, and 15th and 27th of January. A slight shock of the earthquake which totally destroyed the city of Fuligno, &c., on the 13th of January, was felt at Rome, the same day, by some individuals, but not generally.

Though the season has been thus mild, it has not been proportionally healthy: nearly one fourth of the population having been attacked in December with the influenza, which was often severe, and not seldom fatal. It may deserve remarking, that the regular progress of this disease (known in France under the name of *la grippe*), during the summer and autumn, through great part of Europe, from the month of June, when it was prevalent in England, to January, when it had reached Palermo in Sicily (having passed step by step through France, Savoy, Switzerland, and the west side of Italy, to Rome and Naples), does not seem easily explained on any theory of atmospheric influence, which could scarcely have migrated so regularly from place to place during so long a period; and rather confirms the opinions of those Italian physicians who refer it to contagion, and assert that the same disease ran a similar course through several parts of Europe and Italy in 1782.

Moisture.— Some travellers have spoken of the climate of Rome as very damp, from having observed the stone staircases and passages sometimes dripping with wet; but this is only an accidental occurrence, such as happens elsewhere, owing to the change of the wind to the south from a quarter previously colder, and the consequent condensation of the atmospheric moisture on the stonework of the interior of buildings, before they have had time to acquire the warmer temperature of the recent wind. Generally speaking, to judge from ordinary appearances, there has been no ground to complain of the moisture of the climate at Rome during the winter. It should be mentioned, however, that I never recollect to have before noticed so copious a deposition of dew as was often to be seen, in the mornings, upon the surface of the pavement of some of the open squares and roads outside of the town; while the pavement of the streets in the interior of the city, owing, I suppose, to the adjoining houses counteracting the effect of terrestrial radiation, was perfectly dry. It may also deserve notice, in reference to that mysterious pest Malaria, but for which Rome and its vicinity would be a paradise, that all the Romans agree in regarding the hour just after sunset as that when it is most essential to guard against exposure to the sudden change of temperature and copious deposition of moisture, which then seem to give effect to the miasmata, whatever they are, that cause the Roman fever; which, both from its intensity and so much more violently affecting the head, differs considerably from the intermittent fevers of more northern climates. They say, that after the lapse of this hour, or hour and a half, the air has no longer that chill feel which is experienced even in hot weather; and that there is little or no danger from subsequent exposure to the night air, at least in Rome.

Fogs. — Fogs occurred only on six days during the whole winter; namely, on five days in December, and on one in January; and then only in the night and morning; being always occasioned by a north or north-west wind succeeding one from the south or south-west, and being always dispelled by the sun before noon. The atmosphere, however, though not foggy, was occasionally, even when the sun shone, as hazy as in England; and, from what I have observed during upwards of two years' residence in Italy (except in the hot summer months), the accounts in books of the extraordinary general clearness of the Italian sky must be taken with many grains of allowance; the same haziness and consequent indistinctness of distant objects, which are so usual in England, prevailing on a considerable proportion of days in the year.

Progress of Vegetation. — Many elms, acacias, poplars, &c., retained their leaves still green till the latter end of November, when a cold night stripped nearly all except weeping willows, which still kept theirs till the middle of December; and as these last had their leaves one third expanded on Feb. 14., they were without leaves only two months. Daisies, shepherd's purse, wild marigold (Caléndula arvénsis), and other common wild plants, were in flower the whole winter. Violets in flower in great profusion, the last week of January; and almond trees in blossom about the same time. Butterflies and other insects on the wing on fine days, the whole winter. Hive bees busy in flowers, January 28.

It may make this account of the vegetation more complete, to state that we did not find, on our arrival at Naples, that it was at all more advanced there than at Rome, though so much farther south; and that, on the road, we observed in flower, *E*uphórb*ia* dendröìdes, *E*'chium itálicum, *V*ibúrnum *T*ìnus and *L*aúrus nóbilis (in the hedges in great abundance), *E*rìca arbòrea, blackthorn, *A*sphódelus ramòsus? &c. &c. Hawthorn, and some distant willows (not the weeping) with leaves one third expanded.

REVIEWS.

Art. I. *Fauna Boreali-Americana, or the Zoology of the Northern Parts of British America.* Part II., containing the Birds. By W. Swainson, Esq. F.R.S., and John Richardson, Esq. M.D. F.R.S. &c. 4to, 523 pages, with fifty coloured plates, and forty illustrative woodcuts. London, Murray, 1832.

The appearance of the first zoological work ever published under the sanction and by the assistance of the British Government, is more particularly a matter of congratulation to our numerous readers; and the volume before us will justify our warmest and most sincere recommendation.

The objects of natural history collected during the last over-land expedition to the Polar Sea, under the command of Captain Sir John Franklin, to which Dr. Richardson was attached as surgeon and naturalist, being too numerous for a detailed account of them to be comprised within the ordinary limits of an Appendix to the narrative of the proceedings of the journey, as had been the case on previous expeditions of discovery, it was considered desirable, from their great number and value, that they should be made known to the world in a separate form. As it was necessary, however, in order to render such a publication useful, that many of the subjects, particularly in the ornithological and botanical parts, should be illustrated by figures, the expense would have been an insurmountable difficulty, had not His Majesty's government, actuated by a laudable desire to encourage science, most liberally assisted the undertaking. At the recommendation of the Secretary of State for Colonial Affairs, the Treasury granted one thousand pounds to be applied solely towards defraying the expense of the engravings. The first part of this national work has appeared, with 28 spirited representations of Mammàlia, from drawings by Landseer. Part II., the Birds, with 50 illustrations, admirably drawn by Mr. Swainson, and as beautifully coloured, with 40 woodcuts in addition, is now before the public. The entomological part, by the Rev. Mr. Kirby; and the botany, by Dr. Hooker, both equally embellished with numerous plates, also by first-rate artists, are in a forward state. The whole work may be considered a fauna of the British American fur countries worthy the high patronage it has received.

The exertions of the officers, during the lengthened track pursued by the body of the expedition itself, the extent of country traversed by various diverging parties, and the very liberal assistance afforded by the Hudson's Bay Company at their numerous stations in the fur countries, produced materials of no common extent and value. Dr. Richărdson passed seven summers and five winters surrounded by the objects he has so faithfully described. His volume, on the Mammàlia, is a valuable contribution: and of the present volume, the habits of the birds and much of the minute detail of species are also by Dr. Richardson. The plates, as we have before observed, and the systematic arrangement, are by Mr. Swainson.

These scientific zoologists, eminently qualified for the undertaking, have carefully examined the accounts of all the various travellers, from the earliest influence of the Hudson's Bay Company to the present time. Their descriptions include all the birds hitherto found over an immense expanse of country north of the 49th parallel of latitude, and east of the Rocky Mountains, which lie much nearer to the Pacific coast than to the eastern shore of America. Many of these birds are now, for the first time, made known to ornithologists. About 80 of the birds common to North America inhabit also the northern parts of the European continent; and the whole number produced by each of these continents, north of the same parallel of latitude, is very nearly equal, about 320 species.

The French Canadians appear to have been the first who penetrated into the regions beyond the Great Lakes; but their journals, rich in personal adventure, contribute little or nothing to natural history. The early English navigators, who explored Hudson's Bay and the Arctic Seas, limited their notes in zoology to brief remarks on the animals used for food; but seldom gave descriptions sufficiently characteristic to identify the species. The first collections of Hudson's Bay birds of which there appears to be any record, are those formed by Mr. Alexander Light, who was sent out, ninety years ago, by the Hudson's Bay Company, on account of his knowledge of natural history; and by Mr. Isham, who, during a long residence as governor of various forts or trading posts, employed his leisure hours in preparing the skins of Mammàlia, birds, and fishes. These two gentlemen, returning to England about the year 1745, entrusted their specimens to Mr. George Edwards, and 40 of them were figured and described in his *Natural History of Rare Animals*, which reached 7 volumes in quarto. Edwards presented a copy of this work, coloured by his own hand, to Linnæus. This copy is now in the library of the Linnæan Society of London, with the Linnæan specific names added to it in manuscript.

Climate and soil, affecting habits as well as migration, divide the birds of North America into migratory and resident; though comparatively few in the fur countries are strictly entitled to be called resident. The raven and Canadian and short-billed jays were the only species recognised as being equally numerous at their breeding-places in winter and summer, and they pair and begin to lay eggs in the month of March, nearly three months earlier than any other bird in those parts. Many of the species which raise two or more broods within the United States rear only one in the fur countries. the shortness of the summer not admitting of their doing more. The passenger pigeons do not visit the fur countries, where they breed, until after they have reared a brood, and quitted the breeding-places in Kentucky. The hawks and owls are numerous and beautiful. The white-headed eagle (*A´*quila leucocéphala) inhabits the fur countries as well as the United States. Although celebrated beyond all other eagles, by Wilson's admirable description of his mode of pursuing and robbing the fish-hawk, the upright and independent mind of Dr. Franklin induced him to wish that this eagle had not been chosen as the representative of America, because he was a bird of a bad moral character, and did not get his living honestly.

The shrikes, and other insect feeders, varying greatly in size, may be said to swarm particularly in tropical America; so much so, that several individuals of three or four different species may be seen on the surrounding trees at the same moment, on the watch for passing insects; each, however, looks out for its own particular prey, and does not interfere with such as seem destined by nature for its stronger or more feeble associates.

The song-birds are numerous, and vie with each other in pouring forth their melodious notes to welcome each returning summer. The trees spread their foliage with magical rapidity, and every succeeding morning opens with agreeable accessions of feathered songsters to swell the chorus. The most verdant lawns and cultivated glades of Europe fail in producing that exhilaration and joyous buoyancy of mind which was experienced in treading the arctic wilds of America, when their snowy covering has been just replaced by an infant but vigorous vegetation. It is impossible (the authors observe) for the traveller to refrain, at such moments, from joining his aspirations to the song which every creature around is pouring forth to the Great Creator.

Many of the habits of birds are rendered singularly serviceable to man. No sooner has a hunter in the fur countries slaughtered an animal, than the ravens are seen coming from various quarters to feast on the offal. The experienced native, when he sees from afar a flock of ravens wheeling in small circles, knows that a party of his countrymen, well provided with venison, are encamped on the spot; or that a band of wolves are preying upon the carcass of some of the larger quadrupeds; and pushes on briskly, in the certain prospect of having his wants supplied. In Lapland, and other countries where musquitoes abound, the natives highly value the swallow and martin, and place small pots about their houses for these birds to build in, as a return for the destruction they cause among their most annoying and venomous insects. In America the purple martin (*Hirúndo purpùrea*) is also encouraged, by hundreds, to rear its young about the various buildings of agriculturists; but for a different purpose. No sooner does a hawk make his appearance in the vicinity of a farm, to the danger of straggling poultry, than the purple martins, ever on the watch, give notice of the intruder by vociferous notes of alarm. The whole party of martins are instantly assembled; and the common enemy, assailed on all sides, is actually exposed and mobbed, till driven from the spot.

Ten beautiful species of grouse are described by the authors as inhabiting the fur countries. Flocks of ptarmigans, when pursued by the jerfalcon, endeavour to save themselves by plunging instantly into the loose snow, and making their way beneath it to a considerable distance.

But the *Anátidæ* (duck family) are the birds of the greatest importance, as they furnish, at certain seasons of the year, in many extensive districts, almost the only article of food that can be procured. The arrival of the waterfowl, it is said, marks the commencement of spring, and diffuses as much joy among the wandering hunters of the arctic regions, as the harvest or vintage in more genial climes. The period of their migration southwards again, in large flocks, at the close of summer, is another season of plenty bountifully granted to the natives, and enabling them to encounter the rigour and privations of a northern winter. The *Anátidæ* have, therefore, very naturally been observed more attentively than any other family of birds, both by the Indians and white residents; and, as they make up the bulk of the specimens that have been transmitted to England, they are also better known to ornithologists. We must, however, conclude our long extracts and notice of this interesting volume, rich in food for the philosophic naturalist, sincerely hoping, that, with such valuable materials at hand, the aid of the British government will never be wanting to encourage perseverance and the promotion of natural science.

Art. II. *Insect Miscellanies.* [Understood to be by Professor Rennie.] 12mo. London, Charles Knight, 1831.

Sir,

There are a few remarks which I wish to offer on Professor Rennie's last volume, entitled *Insect Miscellanies*, which completes the entomological series in the *Library of Entertaining Knowledge.* If, in one or two instances, I venture to differ in opinion from the author, I trust I shall be excused for the liberty I am taking in so doing. The volume in question is, like its predecessors, highly interesting and valuable: but still, nothing human can be expected to be perfect, or entirely free from errors; and these, when they do occur, it is more especially of importance to point out, in a work like the above, which is so widely circulated, and intended for the use rather of beginners than of professed and learned naturalists. I offer my remarks in the same order in which the passages occur to which they relate, without aiming at a more connected and methodical arrangement.

At p. 12. Professor Rennie states: —

> "We remarked, for several weeks, near St. Adresse, in Normandy, a very limited spot, close by the sea, to be daily frequented by about half a dozen of the clouded yellow butterflies (Còlias Edùsa Stephens), which seemed to make a regular circuit, and return again; altogether independent of the direction of the wind, against which they often made way. Now, as they often rose to so considerable a height that they must have lost sight of the ground, we conclude that they guided their flight more by the weight of the superincumbent air than by the direction of the wind; an inference rendered more probable, by their never being seen on the heights which there rise steeply from the shore."

Without offering any opinion on the particular theory here advanced, I merely wish to mention a circumstance corroborative, in part, at least, of the above statement. I have always considered Còlias Edùsa as one of the most rambling and restless of our British papilios. One instance, however, has lately occurred to me, in which this species seemed to evince a marked and decided attachment to a particular spot. Last autumn I observed five or six specimens of the clouded yellow butterfly flying about, and settling in a very small potato garden, close to the public-house at St. Margaret's Bay, near Dover. They were soon all scared away from the spot by ineffectual attempts to capture them; but on returning to the place, within the space of about half an hour, I found the same number of clouded yellows (doubtless, the individual examples seen before), all collected again in the same potato garden, where they were eventually all captured. On a subsequent visit to St. Margaret's Bay, many specimens of the insect were to be seen, within a short space of the same spot. The specimens here alluded to were all males, which appear to be far more numerous than the other sex. I may remark, for the benefit of the less experienced entomologist, that the lower figure represented at p. 13., and inscribed "pale clouded butterfly (Còlias Hỳal*e*), female," is unquestionably no other than the female of Còlias Edùs*a*, the male of which is figured in the same page. The two species have heretofore been occasionally confounded, I think, by more than one writer; but both sexes of each are now so well known, that I should hardly have expected such a blunder to have been made in the present day, and hope to see it corrected in the next edition.

It is stated at p. 29. that —

> "Fleas and other parasitic insects never infest a person who is near death; and so frequently has this been observed, that it has become one of the popular signs of approaching dissolution."

I thought the fact had rather been the reverse of this. Unless my memory greatly deceives me, I have more than once seen it stated, in accounts of shipwrecks and disasters at sea, e. g. when the crews have been cast upon some desolate island, and exposed to extreme privations and distress, that the sufferers in such cases have become infested with vermin. Be this as it may, however, the appearance of vermin (lice) upon a sick person is, at least in some parts of the country, considered as a sign of approaching dissolution. Some years ago, I recollect attending an aged and infirm woman, in humble life, during her last illness: on my going to the house one day, the daughter, who had all along been in attendance, told me that she felt convinced her mother would not survive long, assigning, at the same time, as her reason for this opinion, that she had lately discovered a louse upon her, a kind of vermin to which she had not previously been subject. The patient died shortly afterwards.

Speaking of the acute scent of insects, Professor Rennie remarks, p. 44.: —

> "We have observed that butterflies of all species, though far from

being voracious feeders, will often dart down from a considerable height upon a flower beneath their track, even when their leading object seemed to be very different from searching for food. This struck us more particularly, in a narrow garden at Havre de Grace, enclosed with stone walls 15 ft. high; for no butterfly, in passing over it, omitted to descend, for the purpose of visiting the blossoms of an alpine bluebottle (*C*entaurèa montàna), whose smell, however, to our organs, is far from being powerful enough to be perceived at the distance of 1 ft., much less at 15 or 20 ft., as it must have been by the butterflies; for we often saw the painted lady (Cýnthi*a* cárdui) and other high-flying species alight there."

This reminds me of a fact which I recollect to have repeatedly witnessed, and to have been much struck with, when a boy at school. Our playground, in shape a parallelogram, or oblong square, was enclosed with stone walls 15 or 16 ft. high; adjoining the playground, on one side was a garden, on the other the schoolhouse and premises, beyond which lay another garden. The boys were frequently in the habit, after they had finished their breakfast, of throwing down the basins in which it had been served, and heedlessly leaving them on the ground; so that it was no uncommon thing to see the playground studded in various parts with some half score or more of such conspicuous articles of white crockery. These basins, I used to observe, invariably attracted the attention of the common white butterflies (Pónti*a* brássicæ, ràpæ, and nàpi), which, in passing over the wall from the adjoining garden, towards the opposite one, seldom omitted to dart down upon them, mistaking them, probably, for so many magnificent and full-blown flowers. In this instance, the butterflies, I conceive, must undoubtedly have been attracted to the object by the sight, and not, as Professor Rennie supposes they were, by the scent, in the case of the alpine bluebottle, in the garden at Havre de Grace.

Many insects have the power of emitting, both in the larva and perfect state, a strong and disagreeable scent; for the purpose, as it is supposed, of self-defence. The effluvia of the wood ants, when their hillocks are disturbed, affects the olfactory organs almost as powerfully as hartshorn. Several species of Phrygànea, and, still more, several Hemeròbii, have an excessively offensive odour.* Professor Rennie observes (p. 53.), from Kirby and Spence, that "some bees (Andrénidæ) have a strong smell of garlic, which may probably be disagreeable to their various enemies." Is it generally known that one species of the bee family, *M*elítta fúlva *Kirby*, which visits our gardens in the spring, when the gooseberries and currants are in bloom, has a powerful and agreeable smell, resembling that of *Verbèna* triphýlla *L.* (Aloýsia citriodòra *Ortega*), but more delicate?

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* Hence Petiver designates one species "Perla minima, merdam *olens*." —[The smallest Perla, smelling of dung.]

Page 213.: —

> "In another interesting bee (Anthóphora retùsa), one of the masons, the distinction of the sexes is so great, that some naturalists of high name have described them as different species. The male is all black, except the hind thighs, which have an orange stripe; while the female is grey, and has the middle pair of feet fringed with long hairs."

Has not the author here just transposed the sexes? I ask the question rather for information's sake, than in the spirit of correction. But I have always been accustomed to consider the black bee as the female, and the grey one, with the pair of beautifully feathered legs, as the male. And, in this opinion I am borne out by the authority of Kirby (see *Monographia Apum Angliæ*, vol. ii. p. 296. 304.), where this great hymenopterist remarks, "The male of this *A*pis is so totally unlike the female, that it has been regarded by all authors, not excepting even Linnæus himself, as a distinct species." He then informs us, that "in an interleaved edition of the *Systema Naturæ*, containing the MS. notes of that great naturalist, he finds it described under the name of *A.* pénnipes." It is not surprising that the two sexes of this bee should have been mistaken for distinct species; it requires, indeed, more than a slight knowledge of its natural history to be persuaded of the contrary.

At p. 215. the professor says: —

> "In the instance of the orange-tip butterfly, while every meadow is swarming with males, we seldom see more than one or two females in a whole season, and those which are observed are seldom on the wing."

The males of very many (perhaps most) insects are far more abundant than the females; and this, no doubt, is the case with Póntia cardàmines. But did the professor bear in mind, when he made the above remark, how very readily the female of this species, which has no gaudy colouring to distinguish it, and catch the eye, may be mistaken, *on the wing*, for other white butterflies, P. nàpi, e. g., and ràpæ? Admitting that the males are (as already said) by far the most abundant, I may state, that I am in the frequent habit of seeing the females every spring in my own garden, as well as in other places, and *on the wing* too.

Speaking of the luminous appearance of the glowworm, the author remarks, p. 226., on the authority of Mr. Knapp, that

> "Observation had taught him that the light is not emitted after the middle of July, at least so clearly and steadily (we found them at Rudesheim, on the Rhine, in full light, at the end of August); but he repeatedly noticed, deep in the herbage, a faint evanescent light proceeding from these creatures, even as late as August and September," &c. &c.

I observed glowworms in full light on the 1st of October, as I passed between Deal and Dover; and I recollect to have once seen one in this county (Warwickshire) shining bright, in a very stormy night, either in November or the end of October. I had no opportunity, in either of these cases, of examining the insects; but would ask whether these late-shining examples may not possibly be a distinct species. Of *L*ampýris splendídula, a British species with which I am not acquainted, I see it stated, in the *Elements of Natural History*, that " it disperses its light chiefly in rainy weather."

Page 229.: —

> " We are not aware that any native insect is luminous besides the glow-worm, and the electric centipede (*S*colopéndra cléctrica), which is by no means uncommon, though its light is seldom seen, in consequence of its living in holes, or under ground, from which it is seldom roused during the night. We have, however, more than once seen it in out-houses, or crawling along a pathway, upon which it sometimes leaves a track of phosphoric matter that may be lifted. On two different occasions we collected some of this, but it disappeared, probably by evaporation, before we could subject it to chemical analysis."

Though I must have frequently seen the insect, I never but once witnessed its luminous appearance. It was in the autumn: I was sitting at table after dusk, and having opened an apricot, was just on the point of lifting it to my mouth, when I was exceedingly surprised at perceiving an annular rim of fire encircling my thumb: it proceeded from a *S*colopéndra eléctrica, which had secreted itself, as is no uncommon case, between the flesh and the stone of the apricot, and was dislodged by my opening the fruit. The insect was of a bright yellow brown colour, longer and much more slender than represented in the figure at p. 230. May not more than one British species be possessed of this luminous property?

The figure of Anthrócera filipéndulæ (six spot burnet moth), at p. 264., I cannot help saying, is a wretched performance: those portions of the wings which ought to have been represented of the darkest, are made of the lightest, shade, and vice versâ. On the whole, it is scarcely sufficiently like the original to enable one to distinguish the insect intended to be represented, except that it can be meant for no other.

Professor Rennie recommends (p. 378.) the *cedar*, among other woods, for the purpose of constructing drawers for cabinets of insects. Let the inexperienced collector be warned that this is, perhaps, the *very worst* wood that can be employed for the purpose; a strong effluvia, or sometimes a resinous gum, exudes from the wood of the cedar, which is apt to settle in blotches on the wings of the specimens, especially of the more delicate Lepidóptera, and entirely discharges the colour. I once had a whole collection of lepidopterous insects utterly spoiled from having been deposited in cedar drawers; and I have understood, also, that the insects in the British Museum, collected, I believe, chiefly by Dr. Leach, have been greatly injured from the same cause. Possibly, however, cedar wood, after it has been thoroughly well seasoned, may be less liable to produce these injurious effects.

Apologising to Professor Rennie for the freedom of the above hasty remarks (which, however, have been dictated solely by a love of truth), and to yourself and your readers for the length to which they have extended,

I remain, yours, &c.

Allesley Rectory, February 22. 1832. W. T. Bree.

Art. III. *The Botanic Annual; or, Familiar Illustrations of the Structure, Habits, Economy, Geography, Classification, and Principal Uses of Plants, with Notices of the Way in which they are affected by Climate and Seasons, and a short Sketch of Coniferæ.* By Robert Mudie, Author of "The British Naturalist," &c. 8vo, 446 pages. London, Cochrane and Co., 1832.

Mr. Mudie, the author, as it now appears, of *The British Naturalist*, has tried his hand at an "Annual." We regret this circumstance, not only because we cordially dislike all Annuals, ay, the whole generation, esteeming them as but petty flimsy wares, mere book-making jobs of a very tawdry description; but also because we think Mr. Mudie a naturalist of sufficient research and ability to have produced a work of a more solid cast, and (as we say) of a larger calibre. Annuals, it strikes us, are, among books, very much what dandies are among men. Their gay and glittering exterior, with all the meretricious trickery of embossed or figured binding, superfine wove paper, and gilt edges, we never can help suspecting may be intended to serve by way of compensation for the absence of more sterling worth within. And when the shine (which is as evanescent as the morning dew, or the bloom upon a ripe plum) is once gone out of these exquisites, their chief attraction is at an end, and they look no better than worn-out finery, or shabby genteel.

On receiving our copy of the *Botanic Annual*, we had, at first, serious thoughts of enshrining it within a glass case, and appropriating it solely and exclusively to the use of the very fairest of the fair sex. But on more mature deliberation, after having taken the precaution to overlay our table with a bran-new covering of the softest satin velvet, and to draw on our own rude hands a spick and span pair of white kid gloves, we did venture, thus equipped, ourselves to open and peruse this delicate and dainty volume; which, in truth, comes behind few, if any, of its congeners, in all the arts and embellishments of modern book-millinery. But, to be serious, for we must be very brief on the present occasion, we really should have liked the volume much better, and should have read it far more comfortably and at our ease, had it appeared in the neat, modest, unassuming garb of homely drab or green calico, and had we been allowed the satisfaction of opening the leaves for ourselves with our own ivory knife, instead of finding them ready cut to our hand, and glittering away like so much gilt gingerbread in a fair. Once for all, we must protest against such attempts at ultra-elegance of outward decoration, which, coupled with the (to us) odious name of Annual, constitute just the sort of thing we do not like, and would have been enough almost to have damned the book in our eyes at the first glance, and at the distance of all across the shop of Messrs. Cochrane and Co. It becomes us not, however, to quarrel with the jewel on account of the brilliancy of the casket in which it is contained. The *Botanic Annual*, we are bold to say, stands in no need either of its fashionable and affected title (to which, indeed, the author himself acknowledges it has no legitimate claim); or of its tinsel decorations, to puff it into notice, possessing as it does quite enough of intrinsic merit, as a popular treatise, to insure it a favourable reception from the public. Though we are not prepared to coincide, through thick and thin, with every sentence to which our author gives utterance, and could readily, were we so disposed, point out many instances of the same kind of verbal inaccuracies, awkward expressions, and obscurities of style, which we noticed on a former occasion, when reviewing the *British Naturalist*, yet we scruple not decidedly to recommend his present performance to our readers; who, we have no doubt, will derive ample amusement and instruction from its perusal. Our limits absolutely forbid us from entering into minute particulars. We shall content ourselves, therefore, with doing little more than making one or two short extracts, and transcribing the heads of the chapters, from which, alone, no inconsiderable insight may be gained into the nature of the work itself. Chap. i. Introduction (on the pleasure and advantages of the study of nature, &c.); Chap. ii. Inducements to study Plants; Chap. iii. Science and Study of Plants; Chap. iv. Anatomy of Plants; Chap. v. Physiology of Plants; Chap. vi. Classification of Plants;

Chap. vii. Sketch of the Coníferæ. We extract the following passage from the conclusion of the 5th chapter, because it serves to elucidate certain phenomena in the decay of aged trees, which we have frequently witnessed, but, we confess, without having been able to assign an adequate cause: —

> " In the boles of large trees of very advanced age, there are often singular struggles for life. In some of these, yews for instance, the very vigour of the growth seems to hasten the decay of part of the stem. Those branches which are nearest the earth are the least exposed to atmospheric action; and the efforts which they make occasion those gnarls and clumps that are so abundant in those trees. But they push inwards at the same time, and by that means compress the vessels in the central parts, and destroy their action. If the upper branches be feeble, as compared with the under ones, an entire excavation is the result; but if these branches be strong, each of them is able to maintain its state of growth; and in those cases, the lower part of the trunk appears like a bundle of rods in a case. In a churchyard at the picturesque village of Loose, in Kent, there is a fine old yew, with a trunk nearly 40 ft. in circumference, and a vigorous head more than 64 ft. in extent, which affords a good specimen of this resistance of decay along certain lines diffused through the trunk. Some of the other Coníferæ have the same habit; among others, the Norfolk Island pine; but the durable parts in it are chiefly knots, which are found dark and resinous in the decayed trunks." (p. 217*, 218.)

Our author, at p. 438., appears to cast some doubt on the generally received opinion, " that the leaves and twigs of the yew are poisonous to cattle." We have been taught, and are rather inclined to believe, that though the yew may be eaten, perhaps with impunity, in a living or fresh state, yet that, when withered, it often proves fatal to cattle which devour it. There are many passages throughout the work, which we feel a strong temptation, did space permit, to transfer to our own pages. But we must forbear; and shall make but one other extract, and that relating to a subject which appears to us to be deserving of further observation and experiment: —

> " The old adage, ' soon ripe, soon rotten,' certainly applies to the individual structures of vegetables; and it is a popular, and, we rather think, a well-founded opinion, that in trees of the same species, and on the same soil, those which expand their leaves last in the spring, and shed them last in the autumn, afford the best timber. We *know* that that is the case with the ash and the beech, and we are inclined to believe that it is general, and that it extends to evergreens as well as to deciduous trees; and it is just what might, in reason, be expected. The early spring, from its frequent alternations of heat and cold, is the trying season for vegetation; and the structures, by which the timber is ultimately elaborated, being repeatedly checked in their formation, cannot, in the nature of things, perform their functions so well as when they meet with no check during the period of their growth." (p. 364, 365.)

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* In the same page, only a few lines above the foregoing extract, mention is made of " the great chestnut tree of *Tamworth:* " we presume this is a mere misprint for " the great chestnut tree of *Tortworth.*"

The woodcuts which illustrate the *Botanic Annual*, are of two classes: viz., full-length portraits of particular trees, and more detailed botanical specimens of several species of the Coníferæ. With the latter we feel no inclination to find fault; they are for the most part neat, expressive, and well executed; the former, we think, are but poor performances. We certainly should not have guessed what species were intended to be represented by the figure of the cedar of Lebanon; and the artist, as it appears to us, has almost equally failed in portraying the close and sable foliage of the yew. If Mr. Mudie is disposed, at any future time, to present us (as we hope he will) with portraits of British trees, we recommend him to apply for that purpose to the same admirable artists, to whom we have ourselves heretofore had recourse on like occasions: we mean Messrs. Strutt and Williams, whose combined efforts in the graphic art, we happen to know, from specimens of the kind which we have seen, are fully competent to delineate both the cedar and the yew, as well as other trees, to the very life.

Enough, we trust, has already been said, to induce our readers to peruse the *Botanic Annual* for themselves. We have only a few words more of complaint to add before we conclude, and these shall now be very few indeed. Our author seems to have a most rooted aversion to every thing in the shape of an index: a deficiency of this kind we hope to see supplied, should a second edition of the work be called for. Ere that time arrives, he would do well to revise and correct his pages, carefully purging them of those not unfrequent blemishes of style and expression, at which we have already hinted. We would entreat him, also, to send forth his offspring into the world decked in a somewhat more chaste and suitable, that is, a less gaudy, attire. This done, there would remain little, save the title of the book, to give us offence, and we might say, with Juliet: —

> "'T is but thy name, that is my enemy; —
> . . . .
> . . . Oh, be some other name!
> What 's in a name? that which we call a rose
> By any other name would smell as sweet;
> . . . .
> . . . Annual, doff thy name."

A. R. Y.

Art. IV. *Catalogue of Works on Natural History, lately published, with some Notice of those considered the most interesting to British Naturalists.*

Anon.: First Report of the Proceedings, Recommendations, and Transactions of the British Association for the Advancement of Science. 8vo, pp. 112. York, 1832.

This pamphlet recounts the results of the scientific meeting at York, in September, 1831, where and when, as is now well known, numerous distinguished promoters and pursuers of science assembled, and occupied themselves for several days in reading essays, delivering lectures, and taking part in scientific conversation. The pamphlet shows that these results were most highly gratifying. A similar meeting, and, as the Association matures, a more perfectly organised one, is to take place annually, in some town, to be determined on some months previous to the time of meeting. The meeting for 1832 is to take place at Oxford, and on the 18th of June.

The objects of the British Association are: — "To give a stronger impulse and a more systematic direction to scientific enquiry; to promote the intercourse of those who cultivate science in different parts of the British empire, with one another, and with foreign philosophers; to obtain a more general attention to the objects of science, and a removal of any disadvantages, of a public kind, which impede its progress."

Anon.: Arcana of Science and Art; or, an Annual Register of useful Inventions and Improvements; abridged from the Transactions of Public Societies, and from Scientific Journals, British and Foreign, of the past Year. Small 8vo, with several engravings. Fifth year. London, Limbird, 1832.

Out of above 300 pages of which this book consists, 120 are devoted to natural history, and in this part the cuts are rather numerous: one of them is a creditable representation of the whale's skeleton now under exhibition at Charing Cross, the scientific details of which were published in our last Number, p. 214—233.; another exhibits a map of the mole's mining operations, as deduced from the experiments, and their published results, of Le Court. The *Arcana of Science and Art* constitute a book exceedingly eligible as a manual for lads.

Jesse, Edward, Deputy Surveyor of His Majesty's Parks: Gleanings in Natural History; with local Recollections.

To which are added, Maxims and Hints for an Angler. 8vo, pp. 320. London, Murray, 1832.

A volume of very pleasing remarks, many quoted, more original, on various individuals of the respective kingdoms of beasts, birds, fishes, reptiles, insects, and plants. It seems a transcript of the natural history note-book of the author, who shows himself very observant of Nature, and especially of her more readily observable creatures, and delightfully susceptible of amiable impressions from them: he has, too, the faculty of expressing easily all his sights and sentiments. The volume produced is an entertaining and popularly readable one for those who are already disposed to derive delight from natural objects. The author disclaims all pretensions to having made his book a scientific one. In this he is right; for it will be found at fault, here and there, on points of science: the author is, perhaps, also prone to proceed to inference on too slender a stock of facts. The remarks on eels will excite research. The "Maxims and Hints for an Angler, by a Bungler," are humorously prescribed, and are doubtless by an expert practician: the author refers them to a friend of his. The chapter on "Roman Antiquities" found by the Thames at Kingston, which includes an engraving exhibiting them, and also several pages to prove that it was here, rather than at Weybridge, that Cæsar forded the Thames, on quitting his encampment on Wimbledon Common, will be interesting to the antiquary, but belongs, perhaps, rather to history than to natural history.

Jenyns, Leonard, Rev., M.A. FLS., and Fellow of the Cambridge Philosophical Society: A Monograph on the British Species of Cy̆clas and Pisídium. From the Transactions of the Cambridge Philosophical Society. 4to, pp. 24, and 3 plates of highly magnified figures. Cambridge, 1832.

The object of this monograph is to digest afresh and add to the number "of certain species of 'bivalve mollusca' inhabiting fresh water, which were associated by the older Linnæan authors either with Cárdium or *T*ellìna." The author remarks that he has deviated from the arrangement of Lamarck, and most authors, in referring them to two genera, Cy̆clas and Pisídium; but that he has done this in conformity with the views of Pseiffer, as exhibited in his excellent *Systematische Anordnung und Beschreibung Deutscher Land- und Wasser-Schnecken,* &c., published at Cassel in 1821. He remarks, however, that "although Pseiffer has the merit of having first separated the above genera, his characters are not clearly defined," &c. The author has endeavoured, and successfully it may be said, to amend Pseiffer's errors and supply his defects; and states, that, in so doing, he has, as to the relation of the parts of the animals and their shells, and the terms used to designate them, adopted the views of Blainville, as presented in his *Manuel de Malacologie.*

Of Cy̆clas, three species are described, viz.: rivícola *Leach*, córnea *Lamarck*, and calyçulàta of *Draparnaud;* as well as varieties of these. Of Pisídium, the species presented are, obtusàle *Pseiffer*, with varieties; pusíllum *Jenyns*, with varieties; nítidum *Jenyns;* pulchéllum *Jenyns*, with varieties; Henslow*iànum* Jenyns; and ámnicum *Jenyns*, with varieties.

Synonymy is ever a matter of much importance to systematic naturalists; and this monograph will to such be really valuable, for the diligence with which synonymes have been collected from Continental as well as from British writers, and for the cautious, judicious, and therefore instructive, adjustment of them. The following quotation will evince the caution exercised: — "In my attempt to determine the species, I have not merely considered the general characters of the shell, but have derived much assistance from attending to the animal inhabitant. Indeed, it is absolutely requisite to caution conchologists against drawing any conclusions, with respect to the specific distinction of these animals, from a mere inspection of the shell alone. This is so liable to vary, from age, peculiarity of situation, and probably from other causes, that it becomes necessary, in some cases, to compare a large number of specimens, collected from different sources, in order to determine the characters of a single species with any degree of precision. Occasionally the shell becomes exceedingly ventricose, at the expense of its height, which is thereby considerably diminished; and the valves, which perhaps naturally meet at an acute angle, under such circumstances meet at an obtuse one. Neither can sculpture be relied upon, the striæ (furrows) varying exceedingly in number and distinctness, according to the nature of the water in which the shell is found: a circumstance of which Dr. Leach was not sufficiently aware when he formed three species out of Pisídium ámnicum. Age, likewise, produces great changes: not only are young shells much more compressed than adult ones, but in many instances the relative proportion of their parts is different. Indeed, in the case of the minute species, so great and general a similarity prevails amongst their young, that it is hardly possible to identify them in this state without the closest examination." From the above remarks and quotation it will be apparent that the monograph is mainly on the systematic relations of these creatures, but the flesh-and-blood naturalists are not wholly forgotten, as incidental notices of habits and manners are mingled with the systematic remarks.

So minute are the objects described, that Cýclas rivícola, the largest of the three species of Cýclas, is only 10½ lines long, 8½ lines high, and 6½ lines thick; and, in the genus Pisídium, four of the species do not exceed 2 lines in length, 1½ in height, and 1½ in thickness. These facts are noticed for the sake of quoting the following remark: — "The discovery of Pisídium pulchéllum, and some other minute species, which, though of frequent occurrence, remained for a long time unnoticed by conchologists, may be attributed to the use of a peculiar net, invented by Professor Henslow, about the year 1815. This instrument, being constructed of the finest wire gauze, enables the collector to strain the water more thoroughly than by any other method previously attempted, and thereby to separate the very smallest shells from the mud in which they are immersed." It is hoped Professor Henslow will early oblige the readers of this Magazine with a drawing and description of so useful an invention.

Sowerby, J., jun.: The Mushroom and Champignon illustrated, compared with and distinguished from the Poisonous Fungi that resemble them. Small 4to, 6 pages of letter-press, and 5 plates of coloured figures. London, Sowerby, 1832.

Concise, clear, useful, and cheap; but only four species are contradistinguished: — *A*gáricus campéstris, the true edible mushroom, from *A.* Geórg*ii*, St. George's mushroom, or white caps; and *A.* praténsis, the true champignon, from *A.* viròsus, the poisonous agaric, which considerably resembles it. *A.* Geórg*ii* is stated to be called "St. George's mushroom, because it is said 'to grow up about St. George's day,' and that it is by no means so wholesome as the true mushroom, because of its dry and tough texture; but it is not poisonous, as it has sometimes been thought to be." *A*gáricus viròsus and its varieties, one of which, being found covered with a sort of gluten in wet weather, is sometimes called *A.* glutinòsus, are all deemed fatally poisonous.

Boué, A., Foreign Secretary of the Geological Society of France: Mémoires Géologiques et Paléontologiques. Treuttel and Würtz.

Of this work, it appears, one volume, consisting of 369 pages, and accompanied by a geological chart of Europe, has been already published; and, by the table of contents, it would appear to contain articles of interest. M. Boué considers that, independently of seven excellent French publications devoted to geology, there is an eligible opening for this work, which is published at irregular intervals, as the accumulation of matter may require, and appears in 8vo volumes of from 20 to 25 sheets, or in half volumes of from 10 to 12 sheets, with an indefinite supply of plates of charts and of sections and figures of fossils. The price is stated to be the lowest possible, to remove an objection which many have felt, viz. that hitherto the most important of geological memoirs have appeared in various publications, whose aggregate expense was such that but few individuals could have access to them all. M. Boué, therefore, besides presenting all the original memoirs he can procure, and with which he solicits his numerous friends, residing in all parts of Europe, to favour him, designs also to present translations of all memoirs or works, in whatever European language they may have been written or published, which treat of the general points of the science, and also to add such local descriptions and useful indications as may be but little known: the whole of the memoirs and the translations are, it appears, to be accompanied by notes explanatory or critical, as the subjects may require. M. Boué takes on himself the translation of memoirs written in every language of Europe, except, perhaps, the Hungarian; and remarks, that, as the promotion of the progress of the sciences of geology and paleontology are his only object, and not the establishment of this or that system, he shall be happy to admit all views, however much opposed to his own they may be, provided they are characterised by consideration, and are not too paradoxical. M. Boué advises those who are disposed to send manuscripts, not to omit such as are voluminous and accompanied by a great number of designs, provided the facts they contain are important, and have been well observed; because, if the publication of the communications so characterised should, on examination, not fall within the scope of his work, they will be received with welcome by the Geological Society of France.

ART. V. *Literary Notices.*

SWAINSON's Ornithological Drawings illustrating the System of Nature. — Mr. Swainson, in a work of this title, is about to give to the world the result of many years' study and preparatory accumulation of material, in a series of coloured drawings, to be published in monthly numbers, each containing five quarto plates; and the first number is to appear on the 1st of October, 1832. "These drawings will be published in series, each of which may be considered as a distinct work, although they will all bear the same title. For reasons not necessary to explain, there will be no letterpress accompanying the drawings; but at the termination of each of the series, except the first, they will be more especially illustrated in a printed volume. . . . . The series will be geographic. The first will comprise the birds of British America, described, but not figured, in the *Fauna Boreali-Americana* of Dr. Richardson and Mr. Swainson. The second series will be a selection of the birds of Great Britain, many of which will, from necessity, be comprised in the first series, but will not, of course, be repeated in the second. The whole undertaking will be completed in 1000 plates, which, if life and health are permitted to the author, he feels confident in being able to execute (humanly speaking) in a few years."

Selby's Illustrations of British Ornithology. — The second and concluding volume of letterpress to this truly national work is now in the press, and will very soon be issued to the public. The descriptive portion of Selby's *British Ornithology* forms a separate work, and can, therefore, be purchased without the atlas plates. The first volume, in octavo, containing a full and admirable account of all our native *land* birds, has long been deservedly prized; and the second volume, which contains the *water* birds, will, it is hoped, be equally valuable.

The Lepidopterous Insects of Java. — Dr. Horsfield is busily occupied in preparing the *third* part of his elaborate work on this subject.

The following works, by Mr. Rennie, are in the press, and will shortly appear: — White's *Selborne,* with new notes; *A Dictionary of Zoology; A Conspectus of Butterflies;* and a work on the *Habits of Birds:* he has also a work in preparation, on the *Faculties of Birds.*

In a few days will appear a work of popular zoology, in one small volume, containing the *Natural History of the Quadrupeds and Birds in the Zoological Gardens,* with numerous authentic anecdotes; intended as a manual for schools and families, and a complete guide for visitors. The book will contain upwards of 100 embellishments, including figures of the principal animals, drawn from life.

COLLECTANEA.

Art. I. *Zoology.*

Rarer Birds taken near Worcester. — Sir, Seeing in your Magazine frequent notices of rare birds, or uncommon varieties, killed in Great Britain, I make no apology for sending you some account of one which has lately come into my possession. It is

A Bird of the Hawk kind, corresponding with the Honey Buzzard in size, and in having the space between the bill and the eye thickly covered with feathers, and without hairs; but differing materially in colour, the plumage being of a uniform dark brown, glossed with purple, appearing nearly black at a little distance; and, upon a close inspection, the tail is seen to be indistinctly blotched or barred with a lighter colour, approaching to ash-colour, and each feather of it being rather pointed makes the tail, when closed, slightly forked. The bill, which is somewhat elongated like that of the eagle, seems to have been of a dark bluish colour; the base of the under mandible, sides of the mouth, and cere, yellow; legs feathered a little below the knee, very strong, and yellow; claws black; the thigh feathers so long as nearly to touch the ground as the bird stands. It was shot in the early part of the last autumn, at Spetchley, near this place, the seat of R. Berkeley, Esq.; and I first met with it at a bird-stuffer's, stuffed, but most miserably deformed, appearing to have the wings dislocated, neck broken, &c.; but the skin has since been relaxed and restuffed by Mr. Thomas Robinson, of this city, a bird-stuffer of considerable merit. As I did not procure the bird in a fresh state, I could not ascertain its sex or the colour of the irides; but I am assured, by the man who first stuffed it, that the eyes were quite dark. I shall be obliged, if you, or any of your correspondents, can inform me if I am correct in supposing the bird I have thus endeavoured to describe to be a variety of the honey buzzard (Fálco *a*pívorus *Lin.*, Pérnis *a*pívorus *Cuv.*), and if such a variety has before been met with; or is it a distinct species?

Of the Grey Phalarope (Phalàropus lobàtus) I have procured this winter a beautiful specimen, killed a few miles hence; and a fine specimen of that very rare bird the Fork-tailed

Petrel (Procellària Leáchii Tem., P. Bullóckii Flem.), four of which were this winter brought to Worcester to be stuffed. One of them was shot swimming on a flooded meadow by the Severn side, near the boundaries of the counties of Gloucester and Worcester; another was taken near the same place; a third in Herefordshire; and the fourth (my specimen) was picked up dead, near Hanbury, in this county. The four were taken at or very near the same time, and were probably stragglers from a flock driven over land by the high winds which prevailed at that period. I am, Sir, yours, &c.—*J. W. Worcester, March* 15. 1832.

More last Words on the Woodpecker.—The Book of Nature, like that of some great and copious Poet or Philosopher, though repeatedly read and perused, is, at every page we casually open, always presenting something new. I could not have supposed myself ignorant of, what I was not aware of till early in this month, that the "*middle* spotted woodpecker" *churrs* on trees, just like his little congener the barred, but not one fourth so long, loud, or rapid; and he goes crawling about the boles knocking and jobbing irregularly. It is not mentioned in any of the books; and had I known this, I should certainly have mentioned it in my article, p. 147., as I do now, to warn young and (like myself) ignorant wood-wanderers not to mistake one for the other: and that future book-makers might be apprised; as I see they continually select from *our* Magazine: and you will surely allow me, Master Loudon, to say, that they cannot copy from a better publication. Many experienced observers are of opinion that the *middle* species is only the young of the *great* spotted; and, indeed, it has many habits, and much the appearance, of a young bird: tame, clumsy, feeble, and familiar; and I fancy it much less brilliant in smoothness and colour of plumage. It will perch sideways for a great length of time on the topmost spike of a very tall larch or spruce, and continually repeat its *check, check, check*: or upon the summit of a lofty cedar of Lebanon, a capital station from my dining-room window, of observing its dress and manners with my ornithoscope. (A foolish phrase invented by me for a small bird-telescope — tell him of the learned query, p. 205. D. S.—like ornithotrophe, for a bird-feeding trencher; but obvious to the least schoolboy on the lowest form, who has thumb'd his *Lexicon* only a week. What would he think of *exsuberator* for a corkscrew? This is an age of the necessity for creating new nicknames and titles — so, "a fico for the phrase" — "Reform it altogether.") This bird differs totally from its little, loud-roaring relative, in being spotted on the black back with white, instead of barred: and in having high beneath, and partly over its vent and uropygium, a large portion of conspicuously splendid scarlet; giving it very much the appearance of an old woman's red petticoat, or the hood of an Oxford A.M. (" take which you will, you will not get much by the bargain "). It is well known that many birds are even three years before they fully assume their plumage. The young swan, or cygnet, would puzzle an early ornithologist, as many of the gulls have *gulled* even the experienced. If, however, this churring *be* a " note of love," — as is asserted by those I am neither capable nor inclined to contradict, — the *middle* spotted woodpecker is established a species; unless, indeed, he is " anticipating his pairing-time," and rehearsing his amatory serenades, previous to his approaching courtships; for love-signs will often appear long before those of puberty. 'T is certainly an odd, and somewhat unpoetical " love-note: " but if the gods have not made these poor birds musical, they must do as our modern fine ladies of fashion do with what they call (and perhaps believe to be) music — make as much noise as they can. — *John F. M. Dovaston. Westfelton, near Shrewsbury,* " *the ten of April morn by the chime,*" 1832.

A technical notice of the middle spotted woodpecker occurs in p. 82. of the present volume. — *J. D.*

The Gallinule (*Gallínula chlóropus* Latham), *a Percher, and excellent for Food.* — Sir, The closeted compiler from the labours of other naturalists, has an easy task to perform, when compared with the out-of-door observer of nature; and the attainment of any new fact in ornithology or natural history is frequently tardy and difficult: but I probably may advance a new fact respecting the common water-hen, which seems to have escaped the observatiŏn of naturalists, or is unnoticed in any of the histories of the feathered tribe which I have been able to consult. What I allude to is the circumstance of this bird's perching or roosting upon trees and shrubs, &c. One of these birds, which I kept in an aviary with some pheasants, although the tip of the wing was cut off, yet at evening it scrambled up into some currant bushes to roost; and in two instances I have shot them: once from the top branch of a tall alder tree (*A*'lnus glutinòsa), and at another time off some shrubs growing on the margin of a brook; but I did not then suspect them to be perchers. Upon mentioning the circumstance, however, to a sporting friend, he immediately corroborated my suspicions; and well remembers these birds roosting in some Scotch pines (*P*ìnus sylvéstris), on an island in a pool before his house. I believe this to be a new fact in the history of this bird; but, perhaps, to the epicure I can advance a more palatable one, when I inform him, that, when skinned, and properly cooked, it is as fine eating as any woodcock (Scólopax rustícola) which ever crossed the German Ocean from Scandinavia: and although the *bon vivant* may turn up his nose at such fare, let the unprejudiced judge through the medium of their own senses, and they will be led to think as highly of this bird as the poor cottager on Cannock Chase did of moles: who used to observe of moles, that, if the gentlefolk knew how good moles were to eat, very few, indeed, would fall to his share. I have observed water-hens, in one or two places, in a state of half domestication, where they have been kept quiet and undisturbed.

Domesticating and promoting the Propagation of various Birds, and of Hares. — It is much to be regretted that some fine specimens of the gallinaceous tribe are suffered yet to fly wild in this country, and in danger of annihilation, without any attempt to domesticate them. The bustard (*O*'tis tárda *L.*), and the capercalzie (Urogállus vulgàris *Fleming*) may be considered nearly extinct, except a few of the latter in Scotland; and, if the waste lands were enclosed, the black cock or grouse (*T*étrao *T*ètrix *L.*) would (except, also, in Scotland) soon become extinct. I have a fine living specimen of this last bird; but have always been unfortunate in my attempts at domestication, as I have frequently had healthy specimens of both sexes, but never a cock and hen at one time. In the spring, the male struts and gobbles, much like a turkey-cock, with fluttering wing and spreading tail, and with the scarlet patches over the eyes flaming with desire; and, doubtless, at this season he will pair with a hen bird when one can be obtained. I have had but little opportunity of observing the red grouse or moorfowl [*Lag*òpus scóticus *Latham*], as I never possessed but one living specimen, which was a wild bird, slightly tipped on one wing, and which fed principally on the seeds and small leaves of heath or ling (Callùna vulgàris); or, practically speaking, I purchased new-made besoms for his food. He, however, died; but from what cause I could not ascertain, as he was in good condition. Providence seems to have placed certain barriers to the domestication of some animals, or rather to their propagation in a state of domestication. I have never heard an instance of the hare (*L*èpus tímidus) breeding in a domestic state, although I have seen them very tame and familiar. Query: How small a space of enclosed ground would the hare breed in, suppose it to be walled or paled round, and kept secure from vermin, &c.? Would she breed in the space of half an acre, or an acre; or what moderately small space would be sufficient?

The Ring Dove, or wood pigeon (Colúmba *P*alúmbus *L.*), has been tried over and over again to be rendered domestic, but without success; and Mr. White of Selborne mentions the eggs being placed under the domestic pigeon (*C.* doméstica *L.*), and hatched; but, somehow, the young ones always died: yet its congeners, the turtle (*C. T*úrtur) and the stock pigeon (*C. Œ̂*nas *L.*), breed in confinement abundantly.

Although the Eggs of the Common Partridge (*P*érdix cinèrea *L.*) may be hatched under the domestic hen, and the young ones will become tame and familiar, yet I have never heard of their breeding in captivity.

The Guinea Fowl (*Numídia* M*elèagris* L.), although reclaimed from its native wilds, retains much of its original independence, and seldom succeeds in rearing its own offspring, which generally falls to the care of good stepmother hen.

The Pea-hen (P*àvo cristàtus*) is a slovenly mother, and not to be depended upon for the safety of its brood; but I have known a tame common hen pheasant (*P*hasiànus cólchicus ♀ *L.*) very careful and assiduous in rearing its young.

Poultry hatched by the Common Buzzard in Captivity. — Now I am upon the subject of hatching, I recollect a singular instance occurring at a farmer's house at Wittington, near Lichfield. A female common buzzard (Fálco *B*ùteo ♀ *L.*, *B*ùteo vulgàris *Fleming*), domesticated and kept in the garden, was every year set with some eggs of the common poultry, which she sat upon with great assiduity, and hatched at the usual time. When the chickens were liberated from the shell, this furious stepmother would scarcely allow any person to approach the wooden box in which the chickens were hatched, and to which they retired whenever they chose; and no dog or cat could approach them without being furiously assailed by the indignant inhabitant. This bird had another singular faculty: it used to roll up a round ball of dirt, on which it usually stood, instead of standing with its feet flat on the ground: and there is a portrait painted of it standing in its favourite position on the ball of dirt. Its fury surpassed that of the common hen whilst the chickens were young, but gradually abated as they grew older; and I have seen some full-grown fowl of its own hatching with it in the garden, feeding and living together. It was at length killed, in the lane adjoining the garden, by some malicious person.

Safe Mode of transporting Eggs to be hatched. — Again, whilst on the subject of eggs and hatching, I can state an excellent mode of carrying eggs which may have been sat upon, so as to preserve them unspoiled until a hen can be found to put them under. A few years ago, whilst crossing a heathy country, my horse trod up a widgeon (Marèca fistulàris *Stephens*); and on getting off, to examine the spot, I found a nest with about eight eggs. I took off my hat, and put some dry herbage into it, upon which I placed the lining of the nest with the eggs, dividing one from the other by a little of the lining; upon which I put more of the herbage, and thrust my head carefully into my hat, and rode quietly home about the distance of six miles: and from the time I found the eggs until I could procure a hen was about the space of two hours and a half; and in about one week the birds were hatched. I have since tried this experiment on eggs mowed or reaped over in the harvest time, and found it to answer: the warmth of the head in the hat being of sufficient temperature to prevent the eggs from spoiling, taking care to walk or ride quietly until a hen can be found. I am, Sir, yours, &c. —*J. C. Dec.* 12. 1831.

Another Instance of Poultry hatched by the common Buzzard (*Fálco* Bùteo L., *Bùteo vulgàris* Fleming). — There is, in the garden of the Chequers Inn, at Uxbridge, a buzzard that has been known in the neighbourhood for twenty years, and has occupied her present quarters for half that time. About eight years ago she first showed an inclination to sit, by collecting and bending all the loose sticks she could obtain possession of. Her owner, noticing her actions, supplied her with materials: she completed her nest, and sat on two hen's eggs, which she hatched, and afterwards reared the young. Since then, she has hatched and brought up a brood of chickens every year. She indicates a desire to sit by scratching holes in the ground, and breaking and tearing every thing within her reach. This last summer, in order to save her the fatigue of sitting, some young chickens, just hatched, were put down to her; but in this case she did not forget her natural appetite, but destroyed the whole. Her family at present (June, 1831) consists of nine; the original number was ten, but one has been lost. There is another brood of chickens in the same garden, but they never venture within her reach. When flesh is given to her, she is very assiduous in tearing and offering her food to her nurslings; and appears very uneasy if, after taking small portions from her, they turn away to pick up grain. —*W. Yarrell. Ryder Street, St. James's, Nov.* 7. 1831.

A white Water-Rail. — Recently a specimen of the water-rail (Rállus aquáticus) was received from Berkshire, every feather of which was of a pure white. The rich coral colour of the beak formed a singular and beautiful contrast to the delicate hue of the plumage. The specimen was sent for preservation to Mr. Leadbeater, to whom I am indebted for the information. — *A. B. Feb.* 16. 1832.

The Habits of the Common Snake (Cóluber Nàtrix), as evinced in Captivity; and a Notice of the prevailing Aversion to Snakes. — Sir, This has been a remarkably good season, both for vegetables and animals. It has been a singular time for adders, snakes, and lizards: I never saw so many as I have seen this year in all my life. I have been trying, a great part of this summer, to domesticate a common snake, and make it familiar with me and my children; but all to no purpose, notwithstanding I favoured it with my most particular attention. It was a most beautiful creature, only 2 ft. 7 in. long. I did not know how long it had been without food when I caught it; but I presented it with frogs, toads, worms, beetles, spiders, mice, and every other delicacy of the season. I also tried to charm it with music, and my children stroked and caressed it; but all in vain: it would be no more familiar with any of us than if we had been the greatest strangers to it, or even its greatest enemies. I kept it in an old barrel, out of doors, for the first three weeks: during that time, I can aver, it eat nothing; but, after a very wet night, it seemed to suffer from the cold. I then put it into a glass vessel, and set it on the parlour chimney-piece, covering the vessel with a piece of silk gauze. I caught two live mice, and put them in to it; but they would sooner have died of hunger than the snake would have eaten them: they sat shivering on its back, while it lay coiled up as round as a ball of worsted. I gave the mice some boiled potatoes, which they eat: but the snake would eat neither the mice nor the potatoes. My children frequently took it out in their hands, to show it to their schoolfellows; but my wife, and some others, could not bear the sight of it. I one day took it in my hand, and opened its mouth with a penknife, to show a gentleman how different it was from that of the adder, which I had dead by me: its teeth being no more formidable or terrific than the teeth of a trout or eel; while the mouth of the adder had two fangs, like the claws of a cat, attached to the roof of the mouth, no way connected with its jaw-teeth. While examining the snake in this manner, it began to smell most horridly, and filled the room with an abominable odour; I also felt, or thought I felt, a kind of prickly numbness in the hand I held it in, and did so for some weeks afterwards. In struggling for its liberty, it twisted itself round my arm, and discharged its excrements on my coat-sleeve, which seemed nothing more than milk, or like the chalkings of a woodcock. It made its escape from me several times by boring a hole through the gauze; I had lost it for some days at one time, when at length it was observed peeping out of a mouse-hole behind one of the cellar steps. Whether it had caught any beetles or spiders in the cellar, I cannot say; but it looked as fierce as a hawk, and hissed and shook its tongue, as in open defiance. I could not think of hurting it by smoking it out with tobacco or brimstone; but called it my fiery dragon which guarded my ale cellar. At length I caught it, coiled up on one of the steps. I put it again into an American flour barrel; but it happened not to be the same as he had been in, and I observed a nail protruding through the staves about half way up. This, I suppose, he had made use of to help his escape; for he was missing one morning about ten o'clock: I had seen him at nine o'clock; so I thought he could not be far off. I looked about for him for half an hour, when I gave up the hunt in despair. However, at one o'clock, as the men were going from dinner, one of them observed the rogue hiding himself under a stone, fifty yards from the house. "Dang my buttons," said he, "if here is not master's snake." He came back and told my wife, who told him to go and kill it. It happened to be *washing-day:* the washerwoman gave him a pailful of scalding soapsuds to throw on it; but whether he was most afraid of me or of the snake is still a question: however, the washerwoman brought it home with the tongs, and dropped it into the dolly-tub. It dashed round the tub with the velocity of lightning; my daughter, seeing its agony, snatched it out of the scalding liquid, but too late: it died in a few minutes. I was not at all angry with my wife: I had had my whim, and she had had hers. I had got all the knowledge I wanted to get; I had learned that it was of no use for a human being, who requires food three times a day, to domesticate an animal which can live weeks and months without food: for, as the saying is, "Hunger will tame any thing;" and without hunger you can tame nothing. I have also learned that the serpent, instead of being the emblem of wisdom, should have been the emblem of stupidity. Sir, yours, &c. —*John Howden. Near Cheadle, Staffordshire.*

The stench emitted by the common snake, when molested, is superlatively noisome; and is given off so powerfully and copiously, that it infects the air around to a diameter of several yards. This I witnessed on observing a bitch dog kill a rather large snake; in which act two points beside the odour effused were notable. The coils of the snake formed, as it were, a circular wall; and in the circular space between it, the snake sunk its head, as if for protection. The dog's efforts were to catch and crush the head; and, shrivelling up her fleshy lips, "which all the while ran froth," she kept thrusting the points of her jaws into the circular pit aforesaid, and catching at and fracturing the head. During the progress of these acts, she, every few seconds, snorted, and shook off the froth, of which she seemed sedulously careful to free herself, and barked at the conquered snake. The dog was a most determined vermin-killer, and in rats, &c., quite an accomplished one; but snakes did not often come in her way. — *J. D.*

Snakes taking the Water. — I once saw a snake in a broad ditch which had been shortly previous "scoured out," as the phrase is, and which was, therefore, devoid of the usual aquatic plants, save the *Lémnæ*, which floated on the water's surface. As *Cóluber Nàtrix* waddled along in the water, his golden head and arched neck looked prettily, and were none the less obvious for the green surface supplied by the above named mantling *Lémnæ*. Does the snake always bolt its food, that is, swallow it whole? I think, not always: for I remember once, in company with a party of haymakers, coming to a sloping ditch side, where a snake lay stretched out, with its head lowest, and near the water in the bottom of the ditch, where it was eating a water newt. One of the haymakers seized the snake by its tail, and held it so that it hung perpendicularly from his hand. Hereupon the newt fell upon the grass; and when the man had held the snake as long as he pleased, he let it down; when it dashed through the water in the ditch to the opposite side, and slid off among the grass and bushes. Attention was now directed to the newt, whose hinder portion had been eaten off; and the part where erosion had ceased displayed thickish blood, of an almost vermilion colour: appearing, doubtless, more striking from its contrast with the dark skin of the newt. — *J. D.*

Zoophytes at Bury St. Edmunds. — The description of a beautiful aquatic animal by Mr. G. Johnston, in the January Number of this Magazine (p. 43.), brings to my recollection a singular phenomenon that I observed, in the summer of 1825, in a small canal which passes across the botanic garden at Bury St. Edmunds, Suffolk. Walking with Mr. Hodson, the proprietor, round the garden, he directed my attention to the dark blood-red colour of the bottom of the canal, occurring in patches about the size of a large cabbage leaf. At first I supposed it was occasioned by some species of minute aquatic moss that grew at the bottom of the water. Mr. Hodson desired I would strike the earth with my feet: this did not sensibly agitate the water, but the red colour at the bottom of the canal gradually though quickly disappeared, without in the least disturbing the mud, or affecting the transparency of the water. In a few minutes, while we remained quiet, the red colour began to appear again, and spread over the spaces it had before occupied. On striking the earth again, it disappeared in a similar manner, and then reappeared a second time. The experiment was several times repeated, with the same results. The proprietor said that no one had given any satisfactory explanation of the phenomenon. I was, however, immediately convinced that the substance which produced the colour was of an animal, and not of a vegetable, nature; and I had no doubt that it was some species of minute radiated animal, that sent forth its red tentacula like the sea anemone. If the botanic garden at Bury be still in existence, perhaps some of your correspondents may have an opportunity of examining, with more attention, an appearance so unfrequent in fresh water. — *R. B.*

With sincerest deference to R. B., the occurrence of this animal is far less " unfrequent " than the above remarks suppose; as it may be found in most drains where mud has accumulated, and over which a slowly flowing stream of partially impure water passes. This is the character of the canal or brook in the above botanic garden; and although a new site for the garden has recently been chosen, there is next to no doubt of the permanence of this brook (the river Linnet is its historical name, it being a tributary of the river Lark, into which it falls at the northern extremity of the old botanic garden); because it is a prescriptive watercourse, or sewer, connected with the drainage of a part of the town to the south. Specimens of the animal, therefore, can, as suggested by R. B., be procured from this particular habitat; but, in truth, there is no need to apply there for specimens, as they will be found in all places of the above character. In the end of February, 1832, I had the pleasure to observe numerous clusters of them in a small ditch or drain in which was some almost stagnant water; not quite half a mile from the end of Oxford Street, on the Bayswater Road. They would still have been there, as the animal scarcely possesses (so I believe) locomotion, although highly capable of exserting and withdrawing its tentacula, but for the rage for perfect drainage which the apprehensions of cholera have recently occasioned. The writer of these remarks has the honour of Mr. Hodson's personal acquaintance, and remembers that Mr. Hodson, jun., who was, in 1828, residing at Cambridge, sent thence to his father the following extract from a London newspaper, asking, at the time, if the animal described was not, without question, identical with that occurring in the Linnet, in the Bury Botanic Garden. — *J. D.*

Fresh-water Polypus. In the shallow ditches in the vicinity of Blackheath, Kent, a species of *Hӯdra* is very abundant; and may be observed, when the water is clear, spreading its reddish tentacula over the mud beneath which its body is concealed. The tentacula are very sensitive; for, the instant that the water is agitated, or even touched, they are withdrawn rapidly within the mud. When taken up, and placed in a glass with water, these zoophytes afford an interesting subject of observation for the young naturalist. (*Newspaper*, 1828.)

Infusory Animalcules. — The German naturalist, Professor Ehrenberg has been for years prosecuting researches on these beings, and has discovered wonders on wonders. Meredith Gairdner, M.D., in a late visit to Berlin, cultivated the acquaintance of Ehrenberg, who explained to him fully, by prelections and the exhibition of the animals (in particular, the anatomy of the Vorticélla cítrina *Müll.*, Rótifer vulgàris of Schrank, and Hydátina sénta), his important discoveries and views. Of all these Dr. Gairdner gives, in a masterly style, an " Analysis," in Jameson's *Edinburgh New Philosophical Journal* for October, 1831, and January, 1832. Dr. Gairdner considers Professor Ehrenberg's discoveries " on the structure and functions of the animals, commonly classed under the denomination of Infusòria," as forming an epoch in the science of phytozoology. He remarks, " I fancy my reader to pause at the mention of structure and functions in animals, the discovery of whose existence merely has been hitherto deemed the ultimatum of zoological research, and regarding which the sum total of our knowledge has been hitherto confined to a few details on their external forms and active motions; yet, in the midst of their transparent tissues, Dr. Ehrenberg has, by a peculiarly ingenious method of observation, developed a highly complicated organisation, which, with those who arrange the animal kingdom in a linear series, will remove them far from the extremity of the scale. The existence of a digestive, muscular, and generative apparatus is established beyond a doubt: and organs have been also discovered which bear great analogy with the vascular and nervous systems. The great changes which these facts must make in the systematic distribution of these animals are obvious. Nay, from some circumstances, we are inclined to believe that future observations may place these microscopic creations in a parallel order with their more apparent prototypes, and with not less varied and interesting gradations of structure." Dr. Gairdner, in proceeding to exhibit the achievements of Dr. Ehrenberg, divides his subject into these heads: — 1st, The History of

Phytozoology: 2d, The Organisation of Infusory Animalcules: 3d, Their Classification: 4th, Their Geographical Distribution.

In the historical part, appraisements of the respective labours of Müller, Nitsch, Schrank, Treviranus, Dutrochet, Oken, Lamarck, Cuvier, Corti, Savigny, Schweigger, Losano, Bory de St. Vincent, Baer, and Goldfuss occur.

The remarks on organisation are introduced by a notice of Dr. Ehrenberg's method of observation. He supplied the Infusòria with organic colouring matter for nutriment. Although this had been done by Trembley and Gleichen before him, it was not till after ten years' observations that Dr. Ehrenberg succeeded in selecting the fittest substances, and in applying them in the best manner. The repeated failure of so many attempts arose from the employment of metallic and earthy colouring substances, or such as had been submitted to boiling in the preparation. These were found either to kill the animals, or be unfit as articles of nutriment. Equally unsuccessful were some attempts made with the indigo and lac of commerce, which were found always to contain a greater or less proportion of white lead. It was not till he used pure indigo, that his experiments succeeded in a desirable manner. It is requisite in these experiments to employ colouring matter which does not chemically combine with water, but is only diffused in a state of very minute division. Indigo, carmine, and sap green, are three substances which answer very well the necessary conditions, and are easily recognised by the microscope. But, whatever substance is used, we must be very particular that it contains no lead; an impurity which very frequently enters into the colours of commerce. It is well, before applying any coloured solution to the drop of fluid under the field of the microscope, to take a general survey of the species which we may expect to find in the drop under examination. Immediately on a minute particle of highly attenuated solution of indigo being applied to a drop of water containing some of the pedunculated Vorticéllæ (which are fittest for the first observation), the most beautiful phenomena present themselves to the eye. Currents are excited in all directions by the rapid motion of the ciliæ, which form a crown round the anterior part of the animalcule's body, and indicated by the movements of the particles of indigo in a state of very minute division in different directions, and generally all converging towards the orifice or mouth of the animal, situated, not in the centre of the crown of ciliæ, but between the two rows of these organs which exist concentric to one another. The attention is no sooner excited by this most singular and beautiful phenómenon, than presently the body of the animal, which had been quite transparent, and bearing much resemblance, in aspect, to some of the marine Rhizóstomæ, becomes dotted with a number of distinctly circumscribed circular spots, of a dark blue colour, exactly corresponding to that of the moving particles of indigo. In some species, particularly those which are provided with an annular contraction or neck (such as the Rótifer vulgàris), separating the head from the body, the particles of indigo can be traced in a continuous line in their progress from the mouth to these internal cavities. Dr. Ehrenberg used a microscope possessing a power of 800, made by Chevalier of Paris; but a power of from 300 to 400 he found sufficient in most cases. For the purposes of measurement he used a glass micrometer, constructed by Dollond, which gives directly the ten thousandth part of an inch, and permits of a much smaller quantity being correctly estimated, as it contains the astonishing number of 400 equal parts distinctly cut in glass within the space of half a line. By means of a micrometer screw, which has since been constructed by Pistor of Berlin, he has been enabled to measure one forty-eight thousandth of an inch, or one four thousandth of a line; a degree of minuteness which is never necessary in actual practice.

By the above infusory mode of rendering the animalcules obvious, and by such a microscope and micrometer to explore their structure and functions, Ehrenberg has demonstrated the existence of a digestive system in all Müller's genera of the Infusòria. The ciliæ, which vary in number in different species, seem to be the principal agents by which they excite those currents which are so beautiful under the microscope, and which have the effect of bringing the nutritive particles infused into the water into contact with their mouths. The mouth merits the notice of the systematologist; from the very precise characters which he can draw from thence for his subordinate divisions. An œsophagus belongs only to those animalcules which possess a notable contraction between the mouth and the stomach. Of the last-named organ (stomach) some species have several; the Mònas tèrmo has four, and other species more; the stomach varies in form also, in different species. The alimentary canal presents, as in other classes of the animal kingdom, the utmost variety, in respect to form, situation, and degree of complication: the anus, also, in its figure and situation, exhibits much variety.

In the muscular system of these beings, Ehrenberg has distinguished eight muscles by name, and disclosed numerous additional facts of great value.

In their generative system, he has proved the existence of all three modes of generation; the viviparous, the oviparous, and the gemmiparous. Some species of the animals are hermaphrodite. Besides clearly demonstrating these three systems (the digestive, the muscular, and the generative,) to exist in these minute beings, Ehrenberg conceives that he also discovers in them a vascular and a nervous system: but the two latter are not considered as yet clearly demonstrated.

Professor Ehrenberg, in his travels in Siberia, found several new genera and species of infusory animalcules, which have already been alluded to in our Vol. IV. p. 255.

In consequence of these most remarkable and important discoveries in the anatomy of these animated atoms, a totally new classification of them has been elicited. Previously, the apparently homogeneous tissues of these minute beings furnished no distinctive characters except the varieties of external form, the presence or absence of ciliæ and other appendages; which are so uncertain, and so changeable, that they have been long ago rejected from other departments of zoology as the fundamental bases of division. Dr. Ehrenberg now forms a classification of them according to their organisation. To follow him through his classes, orders, families, sections, and genera, would lead us too far. For the examination of these, we refer the reader to the January number of the journal quoted; venturing to remark that the scheme of classification there exhibited (p. 82—86.) seems characterised by the deepest and most patient investigation, by clearness of contradistinction, and by ability of expression. Dr. Gairdner remarks that Ehrenberg has "included under his categories those genera or species *only*, whose digestive organs he has demonstrated himself by his new method of observation." A plate (pl. iv.) exhibits magnified figures and dissections of Mònas térmo and átomus *Müller*, Leùcophrys pátula *Ehr.*, and Hydátina sénta *Ehr.*; and displays the wonders of their intestinal structure and general organisation.

The geographical distribution of these beings, invisible to our unaided sight, is the next and last part of the subject discussed. It occupies twelve pages, and is replete with interest. Dr. Ehrenberg has prosecuted his researches on this subject (as well as on others) in extensive journeys in Africa and Arabia, and in Russia, Siberia, and the Altaï mountains; and he has discovered species in the subterranean waters of the silver mines of these mountains, at the depth of 56 fathoms.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Retrospective Criticism.*

Corrections to the last two Numbers. — In p. 128., last line, for " Ambleside," read " Keswick." P. [206.], line 8. from the bottom, for " Nemains," read " remains." The work entitled " Popular Lectures on the Vertebrated Animals of the British Islands " is wrongly arranged, p. 76., among the natural history works of North America.

Stoat. (p. 77.) — J. M. remarks, " the stoat does not change its colour [in winter] here, as in the northern parts." This remark reminded me of a very fine specimen of the stoat in its white state, caught near this place in January, 1830; and which was much finer than many specimens brought from abroad, being all over of a beautiful snowy white colour, forming a striking contrast with the black tip to its tail. This was the first perfectly white British specimen I had ever seen; but I have seen many partially white. I am, Sir, yours, &c. — *E. H. Greenhow. North Shields, Jan.* 28. 1832.

Crows covering their Eggs on leaving the Nest. (p. 144.) — The crows in the vicinity of Lee uniformly cover their eggs, after they have begun to hatch, with the materials of the lining of the nest; and if they comport themselves differently at Walton Hall Park, I should infer the latter to be eccentric crows. I speak positively to the fact as to our crows in Kent; and I doubt not some hundreds of testimonies may be got to prove the fact. — *James Rennie. Lee, Kent, March* 2. 1831.

Couch's Fishes of Cornwall new to the British Fauna. (p. 15.) — Sir, In this article, I have serious fault to find with the disregard of proportion exhibited in two of your figures. The wrass (*Làbrus lùscus L.*), p. 18., is described as being 22 in. long by 2¼ in. deep; your figure (fig. 5.) represents its depth as at least equal to one third of its length, and so 7 in. deep instead of 2¼ in. In p. 21., the dusky perch is described as 3 ft. in length and 7 in. in depth; the figure (fig. 7.) represents it as 12 in. deep. I am, Sir, yours, &c. — *G. A. Goswell Road, Feb.* 6. 1832.

G. A. is thanked for his useful and judicious corrections. That he offers on the *Scómber* maculàtus, spotted or Spanish mackarel (fig. 8. p. 22.), arises from his own misapprehension of the term " compass." It is described as 6½ in. in compass; that is, in circumference, and not in depth, as G. A. has understood it. — *J. D.*

The Opinions of the Reviewer of Newman's Essay on *Sphínx* vespifórmis (p. 187.). — Sir, Without prejudice to the merits or novelty of Mr. Newman's ingenious arrangement of insects, reviewed in p. 187., which I have not at present leisure to investigate, allow me to point out how completely the magical circles employed in the construction of his diagrams appear, from their symmetry, to have blinded the reviewer, so far as the binary division of insects into the subclasses of Mandibulàta and Haustellàta is concerned; and to show how slightly Mr. Newman's general arrangement really differs from that adopted in my *Systematic Catalogue* with reference to such subdivision.

My arrangement, divested of the symbolic circles, stands thus: —

MANDIBULA'TA. HAUSTELLA'TA.
6. Hymenóptera. III. *Homalóptera.*
7. *Strepsíptera.** II. Díptera. IV. *Aphaníptera.*
1. Coleóptera. 5. *Trichóptera.* I. Lepidóptera. V. *A'ptera.*
2. *Dermáptera.* 4. Neuróptera. VII. *Homóptera.* VI. Hemíptera.
3. Orthóptera.

Mr. Newman's thus: —
Orthóptera. (VII.) Hemíptera.
Coleóptera. Neuróptera. (5.) Lepidóptera.
Hymenóptera. (V.) Díptera.

In this last arrangement, if we place the genus *Thríps* in its proper location, at No. VII., and the A'ptera of my *Catalogue* at No. V., their situations between the typical mandibulated and haustellated groups clearly point out, according to the general fact that the characters of any conterminous group assimilate with those of the adjoining, their tendency to become mandibulate; while, on the other hand, if the Trichóptera be placed at No. 5., the cause of their being mandibulate, or approaching thereto, is equally manifest. It is, therefore, evident, that, by considering insects as divisible into two great groups, in accordance with Clairville's views, his followers are not guilty of such "glaring inconsistencies" as a mere *primâ facie* appearance indicates†; and I may add that his arrangement was not "unhesitatingly adopted" by me. It may also be observed, that the location of the A'ptera in my arrangement corresponds with the tendency of opposite points of the circle to resemble each other, as discovered by MacLeay. I am, Sir, yours, &c. — *J. F. Stephens. March* 2. 1832.

Stýgia not a New Holland Genus, as stated in Mr. Newman's Essay on *S*phínx *vespifórmis*. — Sir, In my friend Newman's excellent little essay, Stýgia is said to be a New Holland genus: I feel myself bound, in justice to my friend, to state that this error arose from my inadvertence, and his too great confidence in my accuracy. One species of this genus is a native of France, and one, I believe, of North America; but none have been found in New Holland. Allow me to request from your readers an attentive perusal of this ingenious work, and a careful comparison of the system therein propounded and the quinarian, the only other system which can be said to be an approximation to nature. I am, Sir, yours, &c. — *E. Doubleday. March* 12. 1832.

British White Butterflies. — Sir, In Mr. Rennie's excellent paper on this interesting subject (Vol. II. p. 224.), no mention is made of Hippárchia Galathèa, which surely as legitimately deserves a place among the "white butterflies" as Gonépteryx rhámni; and this is admitted. I am, Sir, yours, &c. — *C. Nov.* 25. 1831.

A figure of the Hippárchia Galathèa will be found in p. 338. of our present Number (fig. 74. *b*); and also one of a most remarkable variety of the same species, in p. 335.; with valuable remarks on each, in their respective places, by Mr. Bree. The valuable strictures of this gentleman, in Vol. III. p. 242., on the probability that Póntia Chariclèa is merely a variety of Póntia brássicæ, and P. Mètra but a variety of P. ràpæ, should ever be read collaterally with Mr. Rennie's article (Vol. II. p. 224.), which excited them. No figure of P. Napæ'æ occurs in that article (Vol. II. p. 227.), which Mr. Bree regrets (Vol. III. p. 245.). — *J. D.*

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* Like all systematists whose schemes are shackled by numbers, Mr. Newman finds it convenient to omit such orders as Strepsíptera, &c. (printed above in Italics), as they militate against the harmony of the cabalistic seven; though they are palpably of greater importance than any septenary division of either of his larger circles.

† The position of Oikéticus amongst the Lepidóptera, while Psýche is distantly removed into the Neuróptera, is unquestionably inconsistent with a natural arrangement; yet those genera are so placed by Mr. Newman: thus showing, when detail is attempted, how futile all our systems become.

Insect Monstrosities. — In recording (Vol. IV. p. 476.) the case of an E'later murìnus found with one of its antennæ three-branched, the fact of a Chlànius vestìtus having been found with a supernumerary appendage to the fourth joint of one of its tarsi, as figured and described in Vol. II. p. 302., is cited as a somewhat parallel instance. Two still more remarkable cases of insect monstrosity, as mentioned by Mr. Dale (Vol. IV. p. 21.), should have been added to this citation. — *J. D.*

London Fogs. (p. 304.) — To J. M.'s useful remarks on this subject, it may be well to register the following supplementary ones: they are transcribed from an ably written, and very recently published, pamphlet, entitled, "*Dr. Weatherhead's Account of the Beulah Saline Spa, at Norwood, Surrey.*" The site of the Beulah Saline Spa is the village of Norwood, seven miles south of London, which stands on one of those elevations known as the Norwood Hills. Dr. Weatherhead remarks: — "From trigonometrical observation, it has been computed that the height of these hills is about 390 ft. above the level of the sea at low water. By accurate observation of the height of the fog, relatively with the higher edifices whose elevation is known, it has been ascertained that the fogs of London never rise more than from 200 to 240 ft. above the same level." [The level of the sea, not that of Norwood, as appears by the second sentence following.] "In some instances, the line of demarcation between the pure air and the fog is distinctly defined; on other occasions, the latter dissipates itself so gradually into the superincumbent atmosphere as to show no line of separation. Thus placed above the fogs of the plain, and removed from the smoky and contaminated atmosphere of the metropolis, the air [of Norwood, and the neighbourhood of the Beulah Saline Spa, is meant] has long been celebrated for its pure and invigorating qualities." — *J. D.*

Anchor Frosts. — Since reading the articles by J. M., p. 91., and T. G., p. 303., on this phenomenon, I have met with the following, which I beg to hand to you: — "It is a curious particular in the natural history of the Thames, that it always freezes just at the bottom: this habit is often found to prevail among rivers in Germany, particularly in the northern parts; but is asserted by the writer of the article Ice, in the *Encyclopædia Britannica*, never to be met with in the more temperate of the European climates. The fact is assuredly otherwise: the congelation of the river Thames uniformly commences in the lowest places. The mass then formed rises, on a rude calculation, to about the middle of the water, where it presents, as on the streams of Germany, a resemblance to the partial consolidation of *nuclei* or small hail. A second mass then forms at the bottom; the central mass rises to the surface, and the new bottom, or ground ice, takes its place, and gradually mounts to the superior fabric, with which it speedily assimilates. Dr. Plott accounts for this circumstance, by supposing that the water of the Thames is more abundantly impregnated with salt than that of other English rivers; and that, as salt naturally sinks to the bottom, and as naturally inclines to a state of congelation, the formation of ice consequently takes place first at the greatest depth." (*Faulkner's Chelsea*, p. 19, 20.)

Anchor Frosts. (p. 91.) — On the subject of anchor frosts, it is merely a long and severe one, wherein large masses of ice are frozen to the stones and gravel at the bottom of rapid streams; not, as your intelligent correspondent J. M. states, by crystals of ice floating down the streams, and accumulating amongst the stones; but simply by the stones acquiring a degree of cold far below the freezing point, and the water in contact with them freezing, and spreading into large sheets, which, from ice being lighter than an equal bulk of water, are frequently torn up in large bodies, and floated away with stones and gravel adhering to the under surfaces. Why ground ice is not frozen in the same way at the bottoms of deep and still pools, well merits a special notice. Water, on decreasing its temperature, increases in density down to about 40°, which is its maximum density; and from that point it continues expanding up to freezing. The cooling process always proceeds over the surface, and as the water there acquires gravity, it descends, and is replaced by some warmer, and, of course, lighter water, which, being at length cooled, sinks in its turn, and in like manner the cooling process goes on, until the whole body of the water attains the temperature of 40°. The cooling process still going on, the surface water expands, and becomes specifically lighter than that below, and is detained there until it freezes; while the great body below, being all at its maximum density, remains quiescent, and preserves its fluidity through the longest and severest frosts, even in very high latitudes. This simple and admirable provision in the constitution of water operates the most important consequences in the wise economy of nature: without it, all ponds, lakes, and other deep and still bodies of water, would be frozen into solid masses, and, of course, all their living productions destroyed. — *J. Carr. Alnwick, Jan.* 8. 1832.

Dew. — The annual average quantity deposited in this country is estimated at a depth of about 5 in., being about one seventh of the mean quantity of moisture supposed to be received from the atmosphere, over all Great Britain, in the year; or about 22,161,337,355 tons, taking the ton at 252 imperial gallons. (*Literary Gazette*, Jan. 29. 1831.)

Spot on the Sun. — A dense smoke fog prevailed on the morning of the 25th of the tenth month (October), in the vicinity of the metropolis; and about 9 o'clock the sun became sufficiently visible for the naked eye steadily to survey its disc, when a large spot was distinctly seen near its centre. The mist must have possessed considerable magnifying power, as the observer endeavoured in vain to discover the same spot some hours after with the naked eye, protected by a single darkened glass. With one of Dollond's 3 ft. telescopes, however, it was perfectly visible, together with another spot near the western limb. — *B. Laytonstone, April*, 1830.

Art. II. *Queries and Answers.*

List of, and short critical Remarks on, the current Periodicals on Natural History. — Sir, A. R. Y. would oblige me, and perhaps some of your other correspondents, if he would give a list of the numerous periodicals now published on the subject of natural history, stating which deserve encouragement, &c. Perhaps his time would not be thrown away, as he must know the wide circulation your Magazine has. — *M. F. Jan.* 12. 1832.

Mr. Dovaston's Ornithoscope. (p. 83. and 205.) — Mr. Dovaston explains (p. 380.) that this is but a small pocket telescope, so denominated when applied to ornithic objects. — *J. D.*

In twin-born Calves, is one of the two invariably sterile? and, if the two be Male and Female, is the sterile one invariably the Female? — Sir, When on a visit, some years ago, at a farm-house, the occupier of which had had considerable experience in breeding cattle, I was told by him that when a cow produced twin calves, of different sexes, the female was always sterile, and that therefore he reared it only for the butcher. Whether the male had the power of generating, I do not recollect if he stated. Can any of your correspondents contradict or confirm this statement; or say whether this curious law obtains with any other animal?

Since writing the above, it occurred to me to consult Bewick, the only authority I have at hand, where I find the following: — "It is a curious fact, that when a cow happens to bring forth two calves, one of them a male, the other a female, the former is a perfect animal, but the latter is incapable of propagation, and is well known to farmers under the denomination of a 'free martin.' It resembles the ox, or spayed heifer, in figure; and is considerably larger than the cow." The criticisms and confirmations of your correspondents on this subject, will, Sir, oblige, yours, &c. — *U. Cambridge, Jan.* 25. 1832.

Information and Queries on the Trachea, or Windpipe, of the Dun Diver (*Mérgus Cástor*). — Sir, Mr. Rennie, in his edition of Montagu's *Ornithological Dictionary* (see p. 218. of that work), has left it still undecided whether the trachea of the dun diver has two enlargements, as that of the goosander (*Mérgus* Mergánser *L.*) has; or only one. As an instance has recently occurred here of the trachea of the dun diver differing from that of the goosander, I beg, through your Magazine, to inform him of it. The bird was in the exact plumage of the dun diver, and was brought to me on December 17. 1831. It weighed 1 lb. 13 oz.; its length was 2 ft.; its breadth 2 ft. 4 in.; and the length of its bill 2½ in. The trachea of this bird had only one enlargement; the labyrinth was large and bony; as the bird was shot in the body, its sex could not be discovered by dissection. The trachea has been preserved. Is this bird to be considered an immature male of the goosander? and is the trachea ever found to alter with age? — *T. K. Dublin, Feb.* 7. 1832.

A Crested Cormorant (*Phalacrócorax* cristàtus *Cuvier*) was brought to me on Jan. 24. 1832. It was a female, and contained a large bunch of eggs, about the size of dust shot, three or four of them about the size of No. 4. shot, and a little detached from the bunch. It can scarcely be considered as having attained its breeding plumage at this season. Is it to be considered a variety or not? — *Id.*

Is the Water Rail (*Rállus aquáticus*) *migratory or not?* — Bewick states it to be so; Latham that it is so only on the Continent; on which point Temminck is silent. Now, on the 24th inst., I had two brought to me, which were caught on the top of our cliff, among the fortifications, at least two miles removed from any spot congenial to their habits: the impression on my mind is, that they had just arrived from the opposite coast, and had dropped from exhaustion, as I have noticed with woodcocks at the time of their migrating into this country. From notes I have by me I find that rails have been caught in a similar manner in two or three other instances; but from my having met with them at all times in this neighbourhood, I cannot believe that they are migratory, but merely change their locality. Perhaps some of your more informed readers can dispel my doubts. I am, Sir, yours, &c. — *E. P. T. Dover, March* 25.

The Senegal Spárrow, a Species of Fringilla. — A little more than three years ago, a relative brought home with him from Charleston, South Carolina, several birds, under the name of cut-throat sparrows, or Senegal sparrows, which, I believe, he purchased from an African vessel. He had several males, though but one female; and she, with one male, was, soon after her arrival at Liverpool, transferred to Lord Stanley's aviary at Knowsley: two of the males he gave to me. One of them I now unfortunately have it in my power to pack up and forward to you; my cat, not having been educated by your correspondent Cattus [Vol. IV. p. 511.], believing that when out of its cage it was fair game. This one, you perceive, is of one uniform dark brown colour, with the exception of the crimson gorget. Two winters ago it assumed this colour, instead of its former coat, which was similar to that still retained by his survivor, namely, a light brown, prettily speckled or spotted by a still lighter, approaching, to fawn colour. So light is the prevalent brown, that the crimson is shown as a dark circle; whereas in the one I send it appears lighter than the rest of the bird. What could have produced this change? — age? They were fed with the same seed, though in different cages, each having a female canary for a companion, of which companion, by the by, they neither of them took any notice. — Can you refer me to any work that will give me any account of these birds, or can you ascertain their generic and specific names? I am, Sir, yours, &c. — *Thomas Edgworth. Wrexham, Dec.* 27. 1831.

The bird our correspondent has sent us is a specimen of the Lóxia fasciàta [doubtless expressive of the crimson band or fascia across its throat] of Brown's *Illustrations of Zoology*, p. 64. pl. 27., upper figure, and is described by Dr. Latham, in his *Index Ornithologicus*, in the *Synopsis*, and in his *General History:* it is also figured in the *Naturalist's Miscellany*, vol. ii. pl. 56., under the name of Lóxia jugulàris [still in allusion to the marking of its jugulum or throat]. It is a native of Africa. From the blood-red colour of the band on the throat of the male, this bird has been called by some the cut-throat sparrow. The female is without the crimson band, and the lower figure on Brown's plate represents the female of this species, although the author has called that bird by a different name. Nor does it belong to the genus Lóxia, as that genus is at present restricted: it is in truth a *F*ringílla. Dr. Latham has recorded that a male in the collection of Lord Stanley [probably one of the birds transferred there as above stated] had the band on the throat of an orange colour. The females have produced eggs in confinement in this country, but we have not been able to ascertain that any one has succeeded in breeding young birds. The uniform dark brown colour of the specimen sent us by our correspondent is one of those changes occasionally produced by confinement, and particular food. We have known it occur in the goldfinch [*C*arduèlis commùnis *Cuvier*], and still more frequently in the bullfinch [*P*yrrhùla vulgàris *Temminck*], when these are fed on hemp-seed. — *S. T. P.*

In Insect Transformations, it is the Tail of the Caterpillar which becomes the Head of the Butterfly. (p. 206.) — Sir, A young lady of my acquaintance was once exceedingly surprised, and kept on the very tiptoe of anxious expectation, by being told, that, if she would go to her friend's stable the following morning, at a certain hour, she might see a *horse with his head where his tail should be.* Accordingly, she repaired to the stable, at the appointed time, fully prepared to see some strange monster, with a head growing out of the rump; or an animal, perhaps, almost as *outré* as the one supposed by Horace in the opening of his *Art of Poetry.* To her no small disappointment, however, when the stable-door opened, there was her own favourite pony, standing with his rump to the manger, and his head, of course, towards the lower part of the stall. This trifling incident was, somehow or other, brought to my recollection on reading the notice of T. C. in your last Number (p. 206.), who states that " it is the tail of the caterpillar which becomes the head of the butterfly." I apprehend that either some hoax or quibble (as in the case of the horse alluded to) must be intended in this statement, or else that not a little confusion has been undesignedly caused by transposing, or otherwise improperly employing, such terms as " head," " tail," " top," " bottom," or the like. At all events, T. C.'s statement, as it now stands, must surely be erroneous. The caterpillar of the common tortoise-shell butterfly (Vanéssa urticæ), for example, suspends itself by the tail, and hangs with its head downwards; and it is this head, or (as it now hangs) lower part of the caterpillar, which becomes the head of the chrysalis; bearing on one side a resemblance to a face or mask, beneath which are incased also the head and thorax of the butterfly. The butterfly bursts the chrysalis towards its head or lower end (lower, I mean, relatively to the position in which it hangs), and comes out thereat; not, as T. C. states, at the top or tail end.* Such, I believe I am justified in saying, is the real fact, after having repeatedly watched the operation of the butterfly bursting from the chrysalis; unless, indeed, I have viewed nature with a sort of inverted vision, and utterly misconstrued her experimental lessons. If wrong, however, I shall be happy to stand corrected: and I have no doubt we shall hear, ere long, what other observers will have to say to the theory of T. C., which, for the present at least, I find harder to believe in than even he appears to have done himself. I am, Sir, yours, &c. — *W. T. Bree. Allesley Rectory, March* 8. 1832.

In Insect Transformations, it is the Tail of the Caterpillar which becomes the Head of the Butterfly. (p. 206.) — Now, Sir, if we believe this assertion, we must disbelieve Reaumur, Swammerdam, Lyonnet, and other authors, who have so thoroughly investigated, and so beautifully illustrated, this subject; and we must disbelieve, also, the evidence of our own eyes, and the result of our own observations. But, of course, no entomologist, not even the merest tyro in the study, will believe such an assertion: yet, for the sake of children, or any marvel-loving persons into whose hands your Magazine may fall, I beg to state my positive knowledge that this miraculous change does *not* take place. I am, Sir, yours, &c. — *Edward Newman. Deptford, March* 20. 1832.

Lamellate Petals, and the Calyx of Dáph*ne* Mezèreum, *and Laurèola.* — L. D.'s query, Vol. IV. p. 188., partly answered Vol. IV. p. 558., will receive a farther solution from the following remarks. Professor Lindley, in publishing Sóll*ya* heterophýlla (a lovely blue-flowered climber, from New Holland) in the *Botanical Register* for January 1. 1832. t. 1466., thus remarks, in describing that species: — "The petals readily separate into two lamellæ, as if they were composed of two plates grown face to face. This may serve to show how unimportant is a similar circumstance in *D*áphne, where it has been thought to be a proof of a calyx and corolla having in that genus grown together into a single floral envelope. We allude to this circumstance now, because we lately saw the idea revived somewhere [doubtless in this Magazine, Vol. IV. p. 558.]; otherwise we should have supposed it to have been long since consigned to the list of exploded errors." Since the remarks in Vol. IV. p. 558., were published, the mezereon, *D*áphne *Mezèreum* L., has blossomed, being now (April 1.)

> ——— "though leafless, well attired,
> With blushing wreaths, investing every spray:"

and the coloured calyx exhibits in the tubular part the lamellate formation above described, as do the calyxes of *D*áphne Laurèola, now also in bloom; but this formation is most obvious in *D*áphne *Mezèreum*, on account of the rosy colour which resides mainly in the outer lamella or skin, the inner fabric not having this rosy hue; and because the solution between the outer and inner lamella is more perfect in the calyxes of *D. Mezèreum*, than in those of *D.* Laurèola, which are, moreover, of a yellowish green hue throughout, as well externally as internally. Some mezereum blossoms will, it is hoped, in northern aspects, be left for L. D.'s examination, even so late as the 1st of May, when this may meet his eye. — *J. D.*

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* If figures be needed in illustration of my meaning, I might refer to the cut of the caterpillar of Vanéss*a* Antìop*a* (*Insect Transformations*, p. 276.), compared with that of the chrysalis of Vanéss*a* I'*o* (p. 295. of the same work); remarking, however, that in the latter of the two cuts the natural position of the chrysalis is exactly inverted, the chrysalis being represented head uppermost. See plate 1. (*P*apílio Antìop*a* of Lewin's *Papilios.*) But a reference far more satisfactory and conclusive than *any book*, of whatever authority, can supply, will be to Nature herself.

Luminous Appearance on the Ears of a Horse. (p. 111.) — When we cannot find a satisfactory solution for any puzzling occurrence which we are desirous of investigating, perhaps the best way is to endeavour to accumulate a series of facts of the same kind. Having met with one or two nearly similar to those of your correspondent, S. T. of Stoke-Ferry (p. 111.), and, like him, having hitherto been unable to light upon a satisfactory reason for them, I propose to join stocks with him for the purpose of drawing more attention.

Some years ago, I was riding from Edinburgh: it was (as I happen to recollect) on the 12th of November, and in the evening. There had been, since past midday, a succession of those stormy clouds, driven by a westerly wind, which are common at that season. Perhaps the wind was a point or two to the north of west, if it makes any difference, and during the intervals there was always a comparative calm or slackening of the wind. I was once taken by one of these storm-clouds about Nether Libberton, on the Dalkeith road. Like S. T., I used the spur a little; and, having been a yeoman for many years, I was unconsciously holding a small rattan cane somewhat after the mode of " carry swords." Roused by the velocity of the wind, and the darkness of the passing cloud, I naturally turned my eyes to the right, and was not a little surprised to observe a pale clear flame, in form like that of a small candle, playing upon the point of the cane. Taking it for granted, forthwith, that a stream of electricity, attracted by the cane, was passing from the cloud through my body, and through the horse, into the ground, I instantly turned it downwards. At the time I did not wait to consider that I was in the hollow of the valley between one of the highest of the Pentlands and Arthur's Seat, and that there were higher objects than myself, and scattered trees in the neighbourhood far more likely to act upon the cloud, or be exposed to its influence.

A short time after this happened, I mentioned the circumstance of the flame to a friend. He told me, in return, that once, when riding between Hawick and Jedburgh, during a dark and stormy night, he was greatly annoyed, for most part of the way, by two flames, like candles, that appeared to issue from his horse's ears. He certainly is as little likely to be affected by superstition as most men; but never before having heard of such a circumstance, and the idea of electricity not then occurring to his mind, he could not help thinking that Will o' the wisp and he, hoping it was nothing worse, had got into rather too close intimacy.

I beg to join my request to that of S. T. for a satisfactory explanation, or more facts. — *W. L. Selkirkshire, Jan.* 30. 1832.

The Luminous Appearance on the Ears of a Horse (p. 111.), *but the luminous Track of the Scolopéndra eléctrica.* — Your correspondent S. T. has very accurately described a phenomenon, which may be often seen on a gravel walk upon a moist autumnal evening. It arises from something of a slimy nature emitted by the *S*colopéndra eléctrica" [see a not very characteristic figure, Vol. II. p. 406.], (one of the animals vulgarly called centipedes), which is luminous. As the animal crawls, it leaves a long train of phosphoric light behind it on the ground, which is often mistaken for the presence of a glow-worm. In all probability, one of these animals had recently crawled over the head of the horse, or rather, might be still crawling there, and your correspondent unconsciously watching its progress. — *J. S. H. Cambridge, Feb.* 14. 1832.

A farther notice of the habits of the *S*colopéndra eléctrica occurs in the present Number, p. 368. — *J. D.*

THE MAGAZINE

OF

NATURAL HISTORY.

JUNE, 1832.

ORIGINAL COMMUNICATIONS.

Art. I. *A Visit to the Surrey Zoological Gardens.*

By Observator.

Previously to the establishment of the Zoological Gardens in the Regent's Park, it had been matter of deep regret to the cultivators of natural history, that we possessed no great scientific establishment for facilitating and encouraging the study of zoology, and no menageries where the natural forms, and in some degree the natural instincts and habits, of the animals of the globe might conveniently be observed and examined. In no other part of Europe were these deficiencies complained of; notwithstanding, we, as a nation, were richer than any other country in the extent of our foreign possessions, and had at our command peculiar facilities for collecting and introducing exotic animals. Under these circumstances, no other resource was left to the student of zoology and the philosopher of nature, but that of visiting the magnificent institutions of other countries, where the requisite aids to their studies might be found. Such, however, have been the progress of, and the increasing taste for, the delightful study of zoology among us, that, in the short space of five years, not only have the Zoological Gardens in the Regent's Park been founded and established, but we have even now a second establishment of the same kind, the Surrey Zoological Gardens: these being similar to the Regent's Park ones in all essential requisites, and equally conducive to the same useful purposes and rational enjoyment. Where the genuine love of science prevails, and where there is an earnest desire to direct the public taste to healthful sources of recreation, there can be no jealous rivalry; and in the present case, too, the Surrey Zoological Gardens and those in the Regent's Park are so distant from each other, that, while this distance will prevent each from trenching on the interests of the other, it will enable the public, according to the point from which they visit, to partake of the recreation either may afford without inconvenience or fatigue.

In a late visit [February] to the Surrey Zoological Gardens, I observed that the most strenuous exertions were being made to render them attractive and useful, as well to the lovers of botany and to the public generally, as to the lovers of zoology. The sides of the principal walks and avenues were being planted with a rich variety of trees and shrubs, of species both native and exotic. These, independently of the attraction of the animals, must, as they become established, and develope their varied and characteristic outlines, and the diversified forms and many-coloured hues of their foliage, constitute a rich source of gratification to the observant visiter, and render the gardens an available resource to the artist, the botanist, and, in short, to all who take pleasure in observing or exploring the charms of vegetable nature. It is, I was informed, to be one of the characteristics of this establishment, that every possible facility will be rendered to every artist, student, or other enquirer, towards the accomplishment of the object he has in view; and, should this enlightened policy continue to be practically observed, it is easy to anticipate that very important benefits to science must daily result from the facilities at the disposal of such an establishment.

The site selected for these gardens was formerly that of the manor house and grounds of Walworth, and comprises an extent of 15 acres, including a beautiful sheet of water of nearly 3 acres.

On entering the gardens by the Camberwell Road entrance, the first objects are a neat Gothic corridor, with two entrance lodges, forming a covered piazza of about 60 ft. long, calculated for company waiting for their carriages. From the mode of colouring adopted [technically called splashing], this building has the appearance of having been erected a century ago; its battlements are also already covered with ivy and other climbing plants. On passing this, you enter a spacious lawn studded with many rare and ornamental trees of most luxuriant growth. Here are situated aviaries containing various species of curassows, jungle fowl, foreign partridges, &c.; with a circular pond, in which are the beautiful summer duck, teal, widgeon, pochard, and many other varieties of aquatic birds. On leaving this part of the garden, you gain an uninterrupted view of the lake, studded with little islands, while on both sides are shrubberies, and the various buildings containing the splendid collection of animals.

Of the buildings, the chief is the dome-shaped circular conservatory, devoted to the large carnivorous animals. This is a grand and unique building, of which I transcribe you the dimensions, as I learned them at the gardens. The conservatory is 300 ft. in circumference, and consists of a dwarf wall which is about 3 ft. high, and covered with an iron coping from which spring iron ribs, 400 in number, converging towards an inner circle: these ribs form a curve and are about 20 ft. in length. The whole of this space is glazed, and is entered by four doors placed at equal distances in the circumference of the building. The plan and design of the building have been furnished, and carried into effect, under the superintendence of Mr. H. Phillips of Brighton. It contains upwards of 30,000 squares of glass. Against the inner circle of this building are the dens; containing the finest collection of the large carnivorous animals I have ever witnessed.

The specimens of the Barbary lion and Bengal tigers here exhibited are most magnificent ones. The male lion of Africa is by far the most noble and perfect specimen I ever remember to have seen: and here, for the first time, I beheld full-grown individuals of the true Asiatic lion; an animal of the greatest rarity, and which may be considered the pride of the collection. Mr. Swainson is convinced it is a totally different species to that of North Africa, and has accordingly named it *Lèo* asiáticus. There are, of course, numerous specimens of leopards, jaguars, puma, and other kindred species. From this building you pass to one of an octagonal form, with paddocks radiating from it, in which are a remarkably fine elk or moose deer, various specimens of the lama, alpaca, vicuna, a pair of fine gnus, the small bush kangaroos, a fine ostrich, with two unique specimens of the cassowary, both of which are particularly beautiful birds. Of the eagle tribe there are several rare species: the young of the white-headed eagle, the harpy (Fálco destrúctor), and that doubtful species named Rappel's vulture. A mass of rockwork or ruins has been erected for the rapacious birds, with chambers underneath, communicating with a run of water for beavers, one of which has been presented by N. Garry, Esq., of the Hudson's Bay Company.

Two very tasteful lodges have been erected for the entrance from the Kennington Road.

On the whole, I think, a more suitable and delightful spot could not have been selected within the same distance of the metropolis. OBSERVATOR.

London, February, 1832.

OF the conservatory so justly admired by Observator, we have in our *Gardener's Magazine,* vol. vii. p. 692, 693., given a figure and short description: these we will here also introduce, in illustration of Observator's remarks, not doubting that the recollection of the clearness of conception which the cut will promote to those who only peruse our *Magazine of Natural History,* will sufficiently apologise for the repetition, to those who are in the habit of reading this Magazine and the *Gardener's Magazine* also. Our description will be found as follows: —

"In the plan, from memory, of this building (*fig.* 83.), the animals (lions, tigers, leopards, &c.) are kept in separate cages or compartments (*a*) towards the centre; exterior to them is a colonnade (*b*), supporting the glazed roof, and also for cages of birds; within this colonnade will be placed hot-water pipes for heating the whole, and beyond it is an open paved area for spectators (*c*); next, there is a channel for a stream of water, intended for gold, silver, and other exotic fishes (*d*); and, beyond, a border, under the front wall, for climbing plants (*e*), to be trained on wires under the roof. It is singular that the elevation of this building (*fig.* 84.) is almost a *fac simile* of the elevation which we made in May last for the hot-houses of the Birmingham Horticultural Society's garden; the only difference being the addition, in our plan, of exterior pits, and of pediments over the entrance porches. The curvilinear sash-bars in Mr. Cross's building are of iron, by Brown of Clerkenwell, and the glazing is beautifully executed by Drake of the Edgeware Road." — *Cond.*

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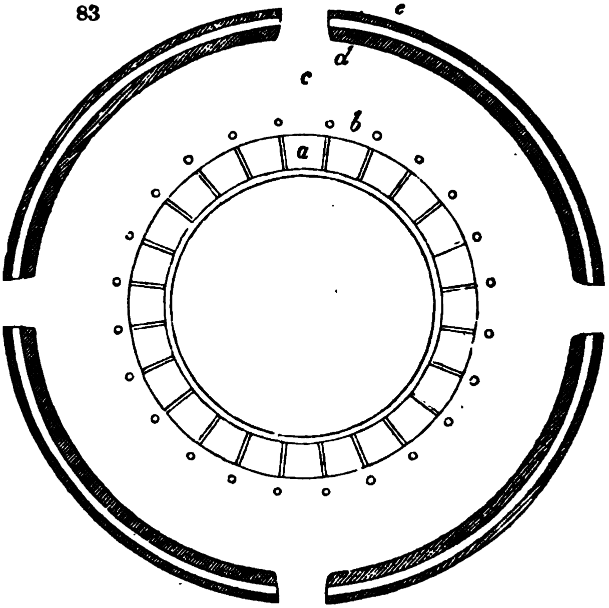

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Art. II. *An Essay on the Analogy between the Structure and Functions of Vegetables and Animals.* By William Gordon, Esq., Surgeon, Welton, near Hull. Read before the Hull Literary and Philosophical Society, Nov. 19. 1830. Communicated by Mr. Gordon.

(*Continued from* p. 128.)

Having now given a very brief outline of the analogy that exists between the organisation of vegetables and that of animals, I shall proceed to point out to what extent the functions of these two classes of beings resemble each other: and, first with regard to *absorption.* It is well ascertained that, after the food has been duly elaborated in the stomach, it is conveyed into the blood, to serve for the growth and support of the body. It is likewise ascertained that the particles of which the animal fabric is composed are constantly undergoing a state of renewal. The decayed molecules are removed, and new ones are deposited in their places. Moreover, it is known that, if mercury be rubbed upon the skin, it is carried into the system, and exercises upon it the same influence as when it is introduced into the stomach; and, if the body be immersed in water or damp air, that the surface will imbibe a great quantity of the watery particles that come in contact with it, and will convey them into the blood. The process by which all these effects are accomplished is called *absorption;* and it is performed by a peculiar set of organs, termed the absorbent system. These organs, which are situated in almost every part of the body, consist of delicate transparent vessels, and of small oblong bodies called glands. The vessels are plentifully furnished with valves, which gives them a knotted appearance. They arise from all the internal cavities, from every part of the surface, and from every organ of the body. In their course, they invariably pass through one or more of the absorbent glands; and, uniting into larger and larger branches, they at length form one common trunk called the thoracic duct; which pours its contents into a large vein, near the heart, and there mingles them with the general mass of blood. The absorbent glands consist of a number of small cells enveloped in a membranous covering, in which is deposited a somewhat viscid fluid. They are found to be most numerous in the higher classes of animals; but in many of the lower classes they are totally wanting. The orifices of all the absorbent vessels, both those which suck up the chyle from the alimentary cavity, and are termed *lacteals*, and those which imbibe substances applied to the skin, and are called *lymphatics*, commence in what are denominated *ampullulæ*, which are small oval vesicles, composed internally, like the absorbent glands, of minute cells, and containing within them a fluid of a viscid nature. The function of absorption is not confined to the lacteals and to the lymphatic vessels. Majendie has shown that it is likewise performed by the veins. That the lymphatics and the veins should exercise the same function is not remarkable; for they both possess the same structure; both arise in the same manner; both are furnished with valves; both carry their fluids from branches to trunks; both absorb their contents on the same principle; and both circulate them by the agency of the same power. The lymphatics, in fact, are nothing more than a subordinate system of veins.

The process of absorption is carried on in plants as extensively as it is in animals: it is performed, too, by similar organs, and on a similar principle. The roots take in the nutritive fluid of the soil in which they are placed, and moisture is plentifully absorbed by the stem and branches. When we examine a root, we find that all the delicate fibrils growing out of it are terminated by small oval-shaped bodies called *spongioles*. These *spongioles* resemble, in their structure and their form, the ampullulæ and the glands attached to the absorbent system of the animal body. Like them, they are composed of small cells, enclosed within a membrane, containing a viscid fluid. They likewise receive the open extremities of the capillary tubes, of which the radical fibrils principally consist, precisely in the same manner as the ampullulæ receive the orifices of the lacteal and the lymphatic vessels.

The vegetable lymphatics, or veins, which arise from the spongioles, are extremely fine tubes. They ascend through the stem, and convey the nutritious materials from the roots to the leaves, where they terminate. In many instances they pass through glands; as, for example, in the gramineous plants, the stems of which have placed upon them, at certain spaces, knots or joints; which, in their structure, are very analogous to the absorbent glands of the animal system. It has long been a subject of enquiry among physiologists, to ascertain upon what principle the contents of the absorbents effect their entrance into these vessels. Some have supposed that they enter on the principle of capillary attraction; others, that they enter by the operation of the vital power: some, by filtration, or imbibition through the coats of the vessels; and others, again, by the pressure of the atmospheric air. Dutrochet, however, ascribes absorption to a new principle, which he calls *endosmose*. It is difficult to decide which of these theories is the most correct. That of Dutrochet appears to me to be the least objectionable. I may remark, however, that, upon whatever principle we explain the entrance of substances into the mouths of the lacteals, the lymphatics, and the veins, belonging to the animal body; on the same we can account for the ingress of substances into the orifices of the absorbents and veins of plants.

From absorption, we pass on to the function of *circulation*. As soon as the chyle, the decayed corpuscles of the system, and the various substances brought in contact with the surface, have entered within the orifices of the absorbents and veins, they are carried along the minute ramifications of these vessels into their larger branches. At length they are all poured, by one or two large trunks, into a vein situate at the left side of the neck. In this vein they are mixed with the whole mass of blood, and conveyed along with it, to the right side of the heart. The venous blood, now replenished with new materials, is propelled from the right cavity of the heart, into the pulmonary artery. By the branches of this vessel it is conveyed through the lungs, where it is exposed to the vivifying influence of the atmospheric air. After it has been duly elaborated in the lungs, it is returned, by appropriate vessels, to the left side of the heart, the contractile power of which forces it into a large artery called the aorta; whose numerous ramifications convey it to every part of the body, furnishing materials for growth, for nutrition, and for the supply of all the various secretions. After serving these purposes, the blood is deprived of its nutritive properties, and, being mixed with the worn out particles, it becomes deteriorated, and unable to afford support or nourishment; it is, therefore, received by the extremities of the veins, and brought back by them to the heart, to acquire the addition of fresh materials from the food, to be again ventilated in the lungs, and again to be distributed all over the body. Such is the circulation of the blood, as it is exhibited in man and other animals of the Mammàlia class, in which the heart is of the most complex character, and consists of *four* distinct cavities. In Fishes, the construction of the heart is much more simple, and possesses only *two* cavities. As we descend in the scale of animal life, we find the heart presenting a progressively greater simplicity of organisation; for, in the more perfect order of *Vérmes*, the only appearance of a heart that can be seen is *one* or *two* small *dilatations* appearing on the branches which unite the abdominal and dorsal bloodvessels together. As we descend another step, we discover that there are some animals, destitute of a heart altogether. This is the case with some of the genera of the Mollusca, and the higher order of Zoophytes. In these animals, the circulation is carried on by only *two* distinct sets of vessels. By one set, the blood is distributed all over the body; by the other, it is brought back to the point, whence it first set out. In animals still less perfect than Zoophytes, as the Infusòria, and the inhabitants of sponges, there is *no circulating* apparatus whatever to be found.

In the higher order of plants, the sap, like the blood of animals, to which it may be considered analogous, is perpetually flowing in a complete circle. We perceive it carried up by the vegetable lymphatics or veins, from the roots, along the stem and branches, to the leaves. In the *upper* surface of each leaf, it is circulated through thousands of minute vessels; where it is acted on by the air and light. As soon as it has undergone its proper changes, it is received by the capillary branches of another set of vessels, which are ramified upon the *lower* surface of the leaf. These reconduct it along the branches and stem, towards the root. In its progress downwards, it supplies abundant matter for the nourishment and increase of the plant, and the expenditure of all the different secretions. What remains after all these purposes have been answered returns to, and oozes through, the spongioles; to be again absorbed along with the other substances from the soil, to be again circulated through the stem and branches, and again subjected to a repetition of all the same processes. This description will be sufficient to show the features of resemblance between the course of the sap in vegetables, and that of the blood in animals.

In the *vegetable* system, we see the crude sap, or lymph, conveyed from the root to the leaves, in the same manner as we see the imperfect blood, or chyle, carried from the stomach to the lungs; we see the sap elaborated in the leaves by the air, as the blood is elaborated by the same agent in the lungs; and we observe the sap, after being rendered, during its progression through the leaves, fit for the support of the vegetable functions, distributed all over the plant, just as the blood, after its ventilation in the lungs, is conveyed to every part of the body. I do not mean to say that vegetables possess a circulating apparatus as complete as that of the higher orders of animals. They have *no* heart, or central organ of circulation; and the vessels which return the elaborated sap from the leaves are, according to Dutrochet, not continuous tubes, like arteries, but consist of small cells or sacs, called *clostres*, which are joined together in such a manner as to resemble a chain of beads. We have seen, however, that, if the heart is wanting in plants, it is likewise wanting in many of the lower classes of animal beings; and it is perhaps to the circulation of blood in these, that the circulation of the sap ought to be compared, although, in many respects, the latter is more perfect and exact than the former. I have already observed that there are some animals which possess no organs of circulation whatever; the same deficiency occurs in some plants, as the mosses and ferns. In these, the sap passes from one cell to another, in the same manner as the nutritive fluid permeates the gelatinous substance of the polypi and other animals, in which there exists no vascular system.

Ever since the discovery of the circulation of the blood, physiologists have endeavoured to ascertain the efficient causes by which this function is carried on. The mechanical physiologists imagine that the heart is the sole agent in the circulation of the blood; that the bloodvessels are in no way concerned in the operation; that they are mere tubes, and that the blood is propelled from the arteries into the veins, and from the latter into the right auricle, by the contractile power of the heart alone. Another set of physiologists consider this opinion as not correct; and affirm that the circulation of the blood is not effected by the action of the heart alone, but likewise, in some degree, by that of the arteries, all of which they suppose to be more or less contractile. They allow that the larger arteries have but little contractility, and the blood which is transmitted through them receives its chief impulse from the heart. The capillary or small arteries, however, they regard as possessing a considerable share of contractile power, by the agency of which the blood is projected along their ramifications into the extremities of the veins. They consider that the veins are little more than elastic tubes; that their action is entirely mechanical, and that the progression of the blood through them is promoted by the *vis a tergo*, [propulsion from behind], and by the pressure of the muscles during their contraction. Among the individuals who hold that the arteries exhibit no manifestations of contractility, are Haller, Bichat, Craigie, Nysten, Pang, and Dollinger; while Hunter, Whytt, Senac, Thompson, Philip, Bikker, and Rossi are among those who entertain a contrary opinion. Wilson supposes that the force of the heart projects the blood through the arteries, and even into the veins, but that it is impelled along the venous trunks into the heart by what he terms *derivation*. Wilson's theory has, with considerable modifications, been adopted by Carson.

Dutrochet, a physiologist of great eminence, conceives that every hypothesis hitherto offered to explain the circulation of the blood is inadequate to the purpose. He has therefore proposed a new one. He seems, indeed, to allow that the power of the heart transmits the blood through the large arterial trunks; and, when there are no capillary branches between the arteries and veins, that this power extends from the former into the latter, and alone propels their contents forwards. He maintains, however, that the progression of the fluids through the capillaries is perfectly independent of the impulse of the heart; at the same time, he denies that these vessels circulate their fluids by the agency of contractility, because this is a faculty, he asserts, which they have never yet been proved to possess. Neither does he admit that the pressure of the contracting muscles is the chief cause of the motion of the blood through the veins and lymphatics. Dutrochet is of opinion that the circulation of the blood is conducted by the operation of *endosmose* [impulse inward]. I shall first endeavour to explain how this principle carries on the circulation of fluid through the lacteals. The extremities of these vessels, as I have before observed, commence in what are called ampullulæ, which are composed of small cells, filled with a dense organic fluid; a condition peculiarly adapted for the exercise of endosmose. In consequence of their endosmosmic power, the ampullulæ of the lacteals cause the chyle, by which they are surrounded, to flow towards them, and to enter their cells. This ingress produces an accumulation of chyle within these organs, which renders them very turgid. In consequence of this turgidity, their natural elastic power is called into play, which, reacting upon the accumulating chyle, forces it into the lacteal tubes. By the introduction of fresh chyle into the cells of the ampullulæ, the current is unceasingly kept up. The lacteal tubes are furnished with glands, which possess the same structure, and exert the same power, as the ampullulæ. When, therefore the ascending column is too heavy for the endosmosmic force of the ampullulæ to urge it forwards, the power of the glands comes in to their assistance, and the current suffers no interruption in its progress. The structure of the lymphatics is precisely the same as that of the lacteals, and the circulation of their contents is conducted on the same principle as that of the chyle. I have now to explain in what manner the capillary circulation proceeds under the influence of endosmose. In the commencement of my essay, I remarked that the organic solids of the body consist of minute vesicles filled with a dense organic fluid, a structure resembling that of the ampullulæ and the glands, and therefore as favourable to endosmose as theirs is. The blood which is brought to these vesicles by the capillary arteries, being less dense than the fluid which these vesicles contain, enters into them. As soon as they are rendered turgid by this afflux, they expel their contents into the capillary veins; and these, again, convey them into the larger veins, and these latter carry them forward into the heart.

There has been the same contrariety of opinion, respecting the circulation of the sap, as has existed with regard to the causes of the circulation of the blood in animals. Malpighi imagined that the sap ascended, by being alternately contracted and dilated. Darwin and Willdenow ascribed the circulation of the sap to the contractility of the sap-vessels, and Perrault ascribed it to fermentation. Knight referred it to the contraction and expansion of the silver grain, caused by the change of temperature in the air; and Hales attributed it to capillary attraction. Dutrochet considers that the sap of vegetables, like the blood of animals, is circulated by the agency of endosmose. The spongioles of the roots, which are constituted like the ampullulæ, absorb the water which surrounds them, not by capillary attraction, but by endosmosmic power. The spongioles being rendered turgid, by this influx into them, act on the enclosed fluid, and urge it forward into the ascending vessels of the stem. The leaves are composed, like the spongioles, of vesicular bodies and vessels. As soon, therefore, as the lymph approaches these organs, they draw it up towards them by endosmose. The indigested sap, being now converted into a nutrient juice, is made to descend, by the impulsive power of the leaves, through the bark and alburnum, by certain elongated cells called *clostres*.

It therefore seems clear that the movements of the sap and the circulation of the blood resemble each other in many particulars; and the theory which will explain the efficient causes of the one, will go far to explain those of the other. The blood of animals, although it appears, as it flows along the arteries and veins, a perfectly homogeneous fluid, is, in reality, a very compound one. It consists chiefly of water, in which is suspended a number of minute globules, and which holds in solution several earthy and metallic salts. By analysis, chemists have obtained from it muriate and subcarbonate of soda; muriate and sulphate of potassa, phosphates of magnesia, lime, and iron, and a small proportion of sulphur. In some animals the blood is red, in others it is colourless. The blood has been shown not only to possess life itself, but to be the material by which the life of all the other parts of the body is supported. The sap, or circulating fluid, of plants, is not homogeneous in its nature; but, like the blood, is a very complicated substance. It is composed of a thin aqueous fluid, in which numbers of exceedingly small globular bodies are observed to float. It contains dissolved in it many saline ingredients; and there can be little doubt that future researches will demonstrate that the sap, like the blood, is endued with life.

(*To be continued.*)

Art. III. *On Birds using Oil from Glands, "for the Purpose of lubricating the Surface of their Plumage."* (See Vol. I. p. 119.) By Charles Waterton, Esq.

> " Nardo perunctus." *Hor. Epod.*
> " Besmeared with ointment."

Sir,

Birds, in general, are much troubled with vermin. After applying the solution of corrosive sublimate in alcohol to the fresh skin of a bird, you will see an amazing quantity of insects coming out from all parts of the plumage, but especially from the head. They linger for a few hours on the extremities of the feathers, and then fall off and die: they are of all sizes, from the full-grown insect down to the minutest little creature which has just entered into life and motion. No part of the body of the bird is exempt from their annoyance; and we may judge how much the birds suffer from it, by their perpetual attempts to free themselves from the tormenting attacks of the insects.

People are apt to suppose that a bird is preening, or rectifying, its feathers, when they see it applying its bill to the plumage, and running it down a feather, from the root to the extremity: but a man well versed in the habits of birds knows, when he sees the bird do this (except after it has got wet), that it is trying to dislodge the vermin, which cling with an astonishing pertinacity to the feathers. Now, while the bird is thus employed on that part of its body just above the tail, where there is a gland, some people imagine that the bird is procuring a liquor from the gland, by means of its beak, in order to apply it to the feathers. But, at best, this can be only mere conjecture on the part of the observer, because the feathers on the rump completely preclude the possibility of his having a distinct view of what the bird is doing.

Will any naturalist declare that he has actually seen a bird procure liquor, or oil, or whatever else you choose to call it, from the gland with its bill, and then apply that liquor or oil to the plumage? The gland has somewhat the appearance of a nipple upon its upper extremity: an oily liquor may be obtained from this nipple by applying our fingers to it; but I marvel how it can be procured by the sharp-edged bill of a bird. When the nature of the gland and the form of the bill are duly considered, it is rational to conclude that the application of the hard bill to the soft gland would be very painful to the bird. Let us here suppose that the bird has succeeded in getting some of the liquor into its bill: how is the liquor to be applied to the feathers? It cannot be rubbed upon them, because it is within the bill; and if the bird should apply its bill to the feathers, they would merely come in contact with the edges of the bill, while the liquor would have sunk into the cavity of the lower mandible. Granting that the liquor were removed to the feathers by means of the tongue, then the under part of the feathers would receive more than the upper part. Here let us keep in mind what a large body of feathers there is to be lubricated, and how small the supply of liquor for the purpose of lubrication. Moreover, the nipple, in general, is crowned with a circle of feathers; and in all waterfowl which I have examined in the duck tribe, from the swan downwards, the whole of the gland itself is covered with a very thick downy plumage, which would totally prevent the bird from procuring any liquor from that quarter.

I will now show that this oily liquor would injure the feathers. The feathers of birds, when in a perfectly dry state, have a beautiful and downy appearance; in a wet state, the downy appearance is lost, but returns when all the moisture is gone: if, however, any greasy substance or oily liquor has come in contact with them, I do not know what could be employed to restore the downy appearance to its pristine beauty. Let any body apply the oil from the gland in question to a feather, and he will produce a fixed stain.

Suppose, for sake of argument, that the bird does actually employ oil from the gland to lubricate the plumage (which, by the by, I flatly deny), how is the head and part of the neck to be supplied with oil? Why, the truth is, they never can be supplied; and if you examine, with the nicest scrutiny, the feathers of the body which come *within* the range of the bill, and the feathers of the head, which are *out* of the range of the bill, and then compare them, you will not observe the smallest difference in their downy appearance: proof positive that the plumage of the body has not been lubricated with oil from the gland.

In this Magazine (Vol. I. p. 119.) there is the following account of the lubricating of feathers: —

> "The glands containing the oil used for the purpose of lubricating the surface of the plumage were, in the specimen here represented (speaking of the eagle) [" sea-eagle of America, or Bird of Washington "], extremely large. The contents had the appearance of hog's fat which had been melted and become rancid. This bird makes more copious use of that substance than the white-headed eagle, or any of the Fálco genus, except the fish-hawk: the whole plumage looking, upon close examination, as if it had received a general coating of a thin clear solution of gum arabic, and presenting less of the downy gloss exhibited on the upper part of the bald-headed eagle's plumage."

Here we have had an abundant flow of oil. If the *surface* got so much, the under parts of the plumage must have got still more; notwithstanding which, we are told that the glands were extremely large: they ought to have been empty after such a discharge. Again, if the *whole plumage* looked " as if it had received a general coating of a thin clear solution of gum arabic," by what process was that general coating applied to the head of the eagle, and to part of the neck, which, we know, cannot possibly be touched by the bill? If it had not been applied to the head and part of the neck, then the bird would have afforded a singular appearance: just as far as the beak could reach, there would have been a distinct coat of what the writer of the article took for oil from the gland; beyond the reach of the beak (that is, on the head, and down part of the neck) there would have been no coating at all.

If that which appeared like a general coating of a thin solution of gum arabic had really been oil from the gland, the feathers would have appeared as if they were in a sweat, the oil would have penetrated down their shafts, the fingers of the dissector would have come in contact with grease or oil at every touch, and the whole plumage would have been completely spoiled.

Much safer would it have been for the writer to have had recourse to conjecture, in this affair of a *general coating* on the whole plumage of the eagle. The bird might have received on its plumage a coat of slime from a fish, struggling and flouncing at its capture, or in the pangs of death; the eagle, after bringing his prey ashore, might have rolled upon it, as we know dogs do upon carrion. In either of these cases there would have been a coating on the plumage, somewhat resembling a solution of gum arabic, while wet; and, when dry, it would have fallen into dust at the touch of the hand; and the feathers would have recovered their downy appearance. In fine, oil or grease on the plumage ought never to have been mixed up in the strange account of the eagle; which would come but poorly off if handled by a severe critic. I would earnestly recommend more practice in ornithology to the writer of the "Notes" [Notes on the Bird of Washington, Vol. I. p. 115—120.]; and I wish that there had been more sagacity shown by those who equipped the "Notes" in a suitable dress to meet the public eye.

I am, Sir, yours, &c.

Walton Hall, April 11. 1832. CHARLES WATERTON.

ART. IV. *Observations on the Eggs and Birds which were met with in a Three Weeks' Sojourn (from May 30. to June 21. 1831) in the Orkney Islands.* By J. D. SALMON, Esq.

Sir,

As I and my brother visited the Orkney Islands last summer, and principally for the purpose of collecting the eggs of the different birds that are in the habit of resorting there annually to incubate, I forward you the results of our journey, as far as they relate to ornithology.

I am, Sir, yours, &c.

Bourn, Lincolnshire, March 19. 1832. J. D. SALMON.

WATER BIRDS.

The Whimbrel (*Scólopax Phæ̀opus* L., *Numènius Phæ̀opus* Latham) we found sparingly in the marshy places between the hills in the Island of Hoy, where it goes by the name of the whaap; but we were too late to obtain any of their eggs, as they had already (June 3.) hatched. We had no doubt that their young were concealed among the long grass (although every endeavour on our part to find them proved ineffectual), from the continued noise that the old birds kept making over our heads; and their immediately attacking every species of gull, and more particularly the arctic gull (Léstris parasíticus *Boié*,) whenever they approached very near, and compelling them to alter their course.

The Curlew (*Scólopax arquàta* L., *Numènius arquàta* Latham) we did not see in any of the islands.

The Snipe (*Scólopax Gallinàgo* L.), we found in abundance in every island, wherever there was the least moisture: and their nests, in general, were placed among the long grass by the side of the small lochs, and amid the long heather that grows upon the sides of the hills. It is there called by the name of the hoarse gowk.

In no single instance did we see the judcock or jack snipe (*S.* Gallínula *L.*).

The Redshank (*Scólopax Cálidris* L., Tótanus *Cálidris* Bechstein) we found but thinly scattered through the different islands here and there: a few pairs occurred wherever the ground was boggy; and they are very noisy should you approach their nest too near.

The Lapwing (*Trínga Vanéllus* L., *Vanéllus cristàtus* Meyer) is very numerous, and known by the name of the tee-whaap. It is suffered to breed unmolested; which, in fact, is the case with all the other birds, as the eggs of the domestic hen and tame duck are very plentiful; and any number might have been purchased, during the time that we were there, at the rate of threepence per dozen; and we were credibly informed that 300*l.* worth, at this rate, were annually shipped for Leith, from the islands of Westra and Papa Westra alone.

The Dunlin (*Trínga alpìna* L., *T. variábilis* Meyer). — This little bird we found in abundance in almost every island, associating with the snipe; and, like the snipe's, their nests were placed upon the ground, among the long grass and heather, and invariably contained four eggs, which were much smaller than snipe's eggs, although similar as to colour. In some we found the ground colour of a light blue, inclining to a dirty white: the blotches were principally at the larger end. The birds appeared to sit very close, and suffered us to approach very near to their nests before they attempted to fly; in two instances I took them off their eggs. After they have been disturbed, they make every effort to decoy you away from their nests, by pretending to be lame, &c. Both the male and female have a black patch upon their breasts; in the former rather darker than in the latter, otherwise we could not perceive any difference between the sexes.

The Oyster-Catcher (*Hæmátopus ostrálegus* L.) we found but thinly scattered along the sea-coast, and making their nests on the sand, among the small shingle and shells that are thrown up by the sea.

The Landrail (*Gallínula Créx* Latham, *Ortygomètra Créx Fleming*) is abundantly dispersed through every island, and conceals itself amidst the young corn and rushes. This bird lays very late. Several nests that we found (June 13.), which were placed among the long rushes (a species of *I'*ris [*I.* Pseùd-*A'*corus *L.*] that grows in abundance in the low swampy places), contained only from one to five eggs; and but in a single nest did we find this number exceeded, in this there were eleven, which is the usual number. Their nests were very slight; composed chiefly of dried grass and moss merely scraped together. Their incessant cry, which I can only compare to the words *crake crake*, repeated a hundred times together, betrays where they are to be found; and we frequently heard from twenty to thirty at the same time uttering this cry, which is not very pleasing to the ear.

The Coot (F*ùlica àtra* L.).—We saw a few pairs of these birds in one of the small lochs in the Island of Sanda, where they are called by the name of the snyth.

Of the Water Hen (*Gallínula chlóropus* Latham) we did not see a single individual.

The Red Phalarope (*Phalàropus hyperbòreus* Latham, *Lóbipes hyperbòreus* Cuvier).—I find that in Rennie's edition of Montagu's *Ornithological Dictionary* it is stated, p. 366., that "Mr. Bullock informed Colonel Montagu, he found it to be common in the marshes of Sanda and Westra." The only phalarope that we found in the small lochs in the Island of Sanda is very accurately figured in the sixth edition of Bewick's *British Birds*, under the name of the red-necked phalarope (Phalàropus fúscus); and Bewick says:—"It differs in plumage from the red phalarope. Its head, and a narrow stripe on the front, and another on the hinder part of the neck, which last spread over the shoulder, were dark ash; throat white; sides of the neck and breast brilliant bay colour; upper parts of the plumage deep brown, nearly black; under parts white." This beautiful little bird appeared to be very tame; although we shot two pairs, those that were swimming about did not take the least notice of the report of the gun: and they seemed to be much attached to each other, for when one of them flew to a short distance, the other directly followed; and while I held a female, that was wounded, in my hand, its mate came and fluttered before my face. We were much gratified in watching the motions of these elegant little creatures, as they kept swimming about, and were for ever dipping their bills into the water; and so intent were they upon their occupation, that they did not take the least notice of us, although within a few yards of them. The female has not that brilliant bay colour upon the sides of the neck and breast, which is so conspicuous in the male. After some little difficulty, we were fortunate in finding their nests; which were placed in small tufts of grass growing close to the edge of the loch; they were formed of dried grass, and were about the size of a titlark's, but much deeper. The eggs are considerably smaller than those of the dunlin, and beautifully spotted all over with brown. They had but just commenced laying (June 13.), as we found only from one to two eggs in each nest; but we were informed (by a boy whom we had engaged in our service) that they always lay four, and are called by the name of the halfwel. It evidently appears to me that this is a distinct species from either the red phalarope (P. hyperbòreus *Latham*, Lóbipes hyperbòreus *Cuvier*), or grey phalarope (P. lobàtus *Latham*, P. platyrhýnchus *Temminck*). I have a specimen of the latter by me, shot January 11. 1828, which is considerably larger than the red-necked phalarope.

The Foolish Guillemot (*Ùria* Troíle *Latham*). — This we found in abundance upon all the headlands, more particularly on the face of the Island of Copinshay, where they are very numerous; resorting to the projecting ledges of the rocks that face the sea, for the purpose of depositing their single egg upon the bare rock. Although we saw a great many, there were not two alike as to colour; in size and shape there is no material difference.

The Razor-bill (*Álca* Tórda *L.*). — This we found equally numerous as the last, and occupying the same rocks, and, like the individuals of that species, depositing their single egg upon the bare rock, without any nest whatever; but their eggs do not materially differ one from another, except that in some the blotches are rather darker than in others: they generally are of a dirty white, blotched with a pale rust colour, and both ends nearly of the same size, not near so much pointed as those of the foolish guillemot.

The Black Guillemot (*Ùria* Grýlle Latham, *Ùria minor* Stephens.). — This beautiful bird differs from the two preceding species in not resorting to the same spots for the purpose of incubation; and, with a few exceptions, its principal place of breeding is upon a small holm (an island without any habitation) lying to the eastward of Papa Westra, where it is very numerous, and would scarcely move from off the rocks on our approach. I cannot find that any naturalist has given a faithful description of the eggs of this bird: in Rennie's edition of Montagu's *Ornithological Dictionary*, it is stated (p. 233.) "that it lays *one* egg, of a dirty white, blotched with pale rust colour, which is deposited under ground, or in some hole in the rocks." This is evidently an error, that being the egg of the razor-bill (*Álca Tórda*). In several dozens of eggs that came under our observation, we invariably found *two* together, and they were deposited upon the bare ground, principally under the large fragments of rocks that lie scattered about upon the island, without any appearance of a nest. The eggs are considerably smaller than those of the razorbill, and about the size of those of a bantam fowl; they are of a grey colour, inclining to a light blue, marked with black and brown spots, and all of them very much alike. This bird is known by the name of the tyste.

The Red-throated Diver (*Colýmbus septentrionàlis* L.) goes here by the name of the rain-goose, and a few pairs of them annually breed on the margins of the small lochs that are to be found amid the hills in the Island of Hoy. Although we visited every loch in the island, we were not fortunate enough to meet with its egg; and are indebted to the son of the Rev. Mr. Hamilton, who very kindly presented us with a specimen that he had taken from a nest the preceding summer. He informed us, at the same time, that they were becoming very scarce; and although he had, at different times, found their eggs, he never saw two in one nest, which is always placed close to the water's edge, and composed merely of a few loose rushes and dried grass that may happen to be near, without any down or feathers whatever.

The Common Tern (*Stérna* Hirúndo L.) is very plentiful, particularly in the Island of Sanda; and the birds of this species deposit their eggs principally upon the bare sand, with little or no nest, along the seaside. Those that we found had only two eggs in each; and I suspect that they very rarely exceed that number, as we met with a boy who had always been in the habit of gathering their eggs, and he said that he never found more than two in one nest.

The Herring Gull (*Làrus fúscus* L.) *and the Lesser black-backed Gull or Silvery Gull* (*Làrus argentàtus* Brunnich), I am inclined to think, are one and the same; for on the small holm lying to the eastward of Papa Westra we found both in abundance, and in some hundred nests that we examined, we could not perceive any very great difference between the eggs of either, as to size or colour. Every nest contained *three* eggs, and not *two*, as stated in Rennie's Montagu's *Ornithological Dictionary* (p. 254.). This statement, I suspect, relates rather to the nest and eggs of the common gull (*Là*rus cànus) which only lays two; at least, I never saw more. In one nest we found all three of the eggs of a light blue colour with black blotches; but, with a few other exceptions, all the eggs were invariably of a dark olive brown, spotted and marked with black and brown blotches. The young are called scauries, and there were already (June 11.) a great number of them hatched. We found several hundreds of these gulls, in an immature plumage, assembled together upon the north part of the Island of Sanda; and, from this circumstance, I am led to believe that they do not breed until they obtain their full plumage, as we did not observe a single instance of a bird out of plumage, among several thousands that were upon the holm near the Island of Papa Westra.

The Common Gull (*Làrus cànus* L.). — We found this only in the Island of Hoy, breeding upon the tops of the highest hills; not very numerous. Their nests were made of sea-weed and tang, and had only two eggs in each, much smaller, but longer in proportion, than those of the herring gull; but very similar as to colour.

The Black-headed Gull (*Làrus ridibúndus* Leisler).—These are not very numerous: we found a few of their nests in the Island of Hoy. They invariably lay four eggs, the ground colour of which is a dirty blue, or an olive brown, and covered with dark brown or rusty red blotches.

The Kittiwake (*Làrus tridáctylus* Latham, L. Ríssa *Lin.*) we found very numerous, and observed them busily employed in building their nests (May 31.) upon the lower shelves or ledges of the rocks on the face of the Island of Copenshay, carrying sea-weed and tang, which they collected as it was swimming about. Their nests were placed close alongside of each other: they had just commenced laying, and we were only able to get three specimens. The eggs are very beautiful; the ground colour is of a reddish white, very faintly spotted with rust; they are much rounder than those of any other gulls, and about the size of the egg of the black-headed gull. It was with very great difficulty that we obtained these and some other eggs, by a man's going along the edge of the rocks, which are almost perpendicular, and 600 ft. in height from the sea: he appeared to traverse it with perfect ease; having previously taken off his shoes. He took a long pole with him, with a sort of spoon fastened at one end; and by this means he obtained some eggs that otherwise would have been out of his reach.

The Arctic Gull (*Léstris parasíticus* Boié). — This we observed in every island; but the principal breeding-places of this species are in the Islands of Hoy and Eday, upon the tops of the highest hills. We were too early (June 14.), as they had scarcely begun to lay. We found only one nest, which was very slight, composed of a few loose straws negligently put together, and containing but one egg (their usual number is two), which was of an olive brown colour, with here and there a streak of black: quite different from the eggs of all other gulls. When the female left her nest, we observed her endeavouring to decoy us away, by pretending to be lame, and tumbling about as if her wing were broken; and it was this circumstance that led us to look more attentively. It is very amusing to see this bird chasing the kittiwake, which it compels to disgorge its food, and before this food reaches the water or land, the arctic gull catches it. This appears to be the only means of subsistence with the arctic gulls, as we never observed them fishing, like the rest of the gulls. The provincial name is scouticurlin.

The Shearwater (*Procellària* Puffìnus *L.*, Puffìnus *Anglòrum* Ray). — This is not near so numerous as most of the other aquatic birds; and it was with very great difficulty that we obtained its egg, as it generally selects the most inaccessible part of the rock, and burrows a hole between the fissures wherever there is any soft earth, and there deposits its single egg, which is of a glossy white, about the size of that of the domestic hen, but more pointed at the smaller end. It is there called by the name of the syre.

The Puffin (*A'lca árctica*). — We found this beautiful bird very numerous, and associating with all the different rock birds; it is known by the name of the Tammy Norie. Like the shearwater, it makes a hole in the soft stratum between the fissures of the rocks that overhang the sea, and, like that bird, deposits its single egg upon the bare ground, without any nest. The ground colour of the egg is white, and invariably speckled with light reddish spots.

The Red-breasted Merganser (M*érgus serràtor* L.).—We saw several male birds in the Loch of Stennis; but could not discover a single female, and suppose that they must have taken their young away, as we were assured that they annually breed upon the small holms in the loch, and upon the shore. I have since seen some eggs that were taken hence by your correspondent Mr. Drosier [see his *Ornithological Visit to Shetland and the Orkneys*, in Vol. III. p. 321—326., and Vol. IV. p. 193—199.]; and they are of a fawn colour, about the size of those of

The Wild Duck (A`*nas* B*óschas* L.), which is also very plentiful.

The Smew (M*érgus albéllus* L.). — We found a nest which, we are inclined to think, belongs to this species, in the Island of Sanda, close alongside a small loch in the parish of Binness. We put the female off her nest. After flying round two or three times, she alighted in the loch; and although we could not get near enough to shoot her, yet we could distinctly perceive, by the formation of her bill, that she corresponded with that figured by Bewick, under the name of the *Lough Diver*. The nest contained eleven eggs, rather larger than those of the teal, but very similar as to shape and colour. The nest was made of moss, and lined with feathers and down, and placed amid the long grass. I wish we had been fortunate enough to secure her, which would have cleared up all doubts.

The Eider Duck (A'*nas mollíssima* L., *Somatèria mollíssima* Fleming).— We found specimens of this species breeding upon a small holm, near Papa Westra, among the loose rocks: they made no effort to get away, suffering us to approach within a few yards before they offered to leave their nests; and in one instance I took one from off her eggs. They lay from four to five eggs, which are very smooth, of a pale olive colour, and very pointed at the smaller end. The nest is lined with down, but not in such abundance as we were led to expect. The individuals of this species are not very numerous; and are known by the name of the dunte goose.

The Sheldrake (A'*nas* Tadórna *Gmelin*, Tadórna *Vulpánser* Ray) is tolerably numerous; and breeds in the rabbit holes in the Island of Sanda. The provincial name is the sly goose.

The Cormorant (P*elecànus Cárbo* L., *Cárbo Cormorànus* Meyer) *and Shag* (P. *Gráculus* L., P*halacrócorax Gráculus* Cuvier) we found very numerous, building their nests, which are principally composed of withered sea-weed and sticks, upon the projecting shelves of the rocks that overhang the sea. These contain from three to four eggs, of a bluish white, irregularly coated with a thick chalky substance. The eggs of the cormorant are a trifle larger than those of the shag; with this exception we could not perceive any difference. Both of them are much smaller than those of the domestic hen in circumference, but of the same length, or rather longer.

LAND BIRDS.

We did not notice any great variety of land birds. The following are those that came under our immediate observation: —

The Golden Eagle (*Fálco* Chrysàetos L., A'*quila* Chrysàetos Vigors) *and Sea Eagle* (*Fálco* Ossífragus L., H*aliæ`etus Albicílla* Savigny) are the only eagles that we saw. Both of them have their eyries in the Islands of Hoy and Eday. We were too late to obtain their eggs. Both of them lay from two to three; and these scarcely exhibit any difference as to size: they being not quite so large as those of the goose, but much rounder. This information we had from a man who has taken their nests for several years; and he said that he never knew them to lay a second time, should their eggs be taken away. This spring (1831) he took three eaglets from the nest of the golden eagle, and one of them was living at Stromness when we were there.

The Peregrine Falcon (*Fálco peregrìnus* Aldrov.).—These are very sparingly dispersed through the different islands, and resort to the most inaccessible rocks for the purpose of incubation; and, wherever there is any considerable number of rock birds, there you are sure to see a pair of these birds. We noticed a pair at the Island of Copenshay, and another pair in the Island of Hoy. We were not fortunate enough to procure any of their eggs. A boy brought us three eggs, which were perfectly round, marked with large red blotches, and rather longer than those of the kestrel (Fálco *T*innúnculus *L.*). The nest was taken from the crags, and was built of heather. We at present do not know to what species to attribute them, never having seen any like them before.

The Raven (*Córvus Còrax* L.) is very plentiful through the different islands. On the 9th of June, as we were leaving the Bay of Kirkwall, for one of the other islands, we counted twenty four of these birds, as they passed over our heads, flying toward the North Isles; they were very near to each other, and followed in the same way as we should expect to see rooks do in leaving their rookery. We again observed them (supposed to be the same) on the 15th, in the evening, flying towards the Island of Hoy, or the South Isles, and we counted twenty-six. I believe this is rather an unusual occurrence, never before having seen more than a pair or two together. We could not be mistaken, as the rook (*C*órvus frugílegus *L.*) and crow (*C*órvus *C*oròne *L.*) are never seen upon those islands.

The Hooded Crow (*Córvus Córnix* L.) we found in tolerable plenty; not associating together in communities, but, like the crow (*C*órvus *C*oròne *L.*), preferring to build their nests separately. These are placed among the rocks, and upon the sides of the deep chasms that are to be found upon the sides of the hills; generally upon the ledge of a rock, among the overhanging heather. The outside of the nest is composed of withered heather, and large roots or stalks, and it is lined with wool and hair. In one nest that we looked into, we found three young ones, and they were almost in full plumage, which had precisely the same colours as that of their parents. The usual number of eggs that this species lays is from four to five, and these are much lighter, and a trifle larger, than those of the crow.

The Starling (*Stúrnus vulgàris* L.).—We observed this perched upon every slight eminence, building its nest in the crevices of the stone walls raised to partition the different fields; and, in a few instances, we found them breeding among the loose rocks or stones that lay scattered upon the sea shore.

The Mountain Linnet (F*ringílla móntium* Gmelin, *Linària montàna* Ray). — This was the only species of linnet that we saw; and, in two nests that came under our observation, one was placed upon the ground, among the young corn, the other amidst some whins [*U*'lex]. They were both alike: their outsides were composed of small roots, and dried grass; and their insides lined with a small quantity of hair and a few feathers; and each contained six eggs, similar in appearance to those of the grey linnet (*F*ringílla Linòta *Gmelin*, Linària Linòta *Cuvier*), but rather smaller.

The Skylark (A*laúda arvénsis* L.), *Rocklark* (A'*nthus rupéstris* Nilsson), *and Titlark* (A'*nthus praténsis* Bechstein). — We found all three of these equally numerous. The latter is known by the name of the grey teeting.

The Wheatear (*Saxícola* Œ*nánthe* Bechstein). — This is very numerous, and called by the name of the chack. Like the starling, it builds its nests in the crevices of the stone walls, and very often in the rabbit burrows; and lays from five to six light blue eggs, similar to those of the redstart (Sýlvia *P*hœnicùrus *Latham*).

The Sand Martin (H*irúndo ripària* L.).—This was the only species that we saw; and a few pairs of them were skimming over a small loch, in the Island of Sanda.

The Wild Pigeon (*Colúmba* Œ'*nas* L.). — This we found very numerous, breeding in the crevices of the rocks. The nests are placed at such a depth that it is impossible to reach them.

The Red Grouse, or Moorfowl (L*agòpus scóticus* Latham). — This is the only species of grouse to be found in any of the islands, and it is tolerably plentiful. The birds of this species make little or no nest (which is placed under the long heather), and lay from ten to eleven eggs, beautifully spotted with black or brown, the ground colour being of a light reddish colour. The birds appear to sit very close, as we took a female off her eggs.

The Golden Plover (C*haràdrius pluviàlis* L.). — This bird we found abundantly distributed over the different islands, preferring the high hills that are covered with heather. They make little or no nest, selecting a tuft of heather, where they deposit their four eggs, the ground colour of which is of a light reddish colour, spotted with black. Both male and female have a black patch upon the breast. It is much brighter in the male; and at the same time it is extended quite up the throat, which is not the case with the female.

The Ring Dottrel (*Charàdrius hiatícula* L.) is very numerous in most of the islands; more particularly in the Island of Sanda. They had all hatched their young when we were there, which was from the 30th of May to the 21st of June.

Art. V. *A few Remarks on the Nightingale and the Blackcap.* By John F. M. Dovaston, Esq. A.M. Oxon., of Westfelton, near Shrewsbury.

> "Which of two maidens hath the merrier eye."
> *Shakspeare.*

Sir,

Fully concurring with the sapient wag who says that "comparisons is odorous," I premise that I intend "no offence i' th' world" to either of these two delicate birds and most delicious melodists; nor presume to put them into competition of taste or talent, by introducing them together; for, like honest Petruchio, though a gentleman, they "go but mean-apparell'd;" well aware they have other claims than their clothes give, to gentility and genius. Though the nightingale visits, to some extent, the southern parts of this county, he very rarely honours this north-western corner where I reside, here, on the borders of Wales; nor have I ever heard him beyond the first range of our hills, though very near to their southern sides. My enthusiastic friend, John Clavering Wood, Esq., some twenty years ago, annually turned out two or three pair, with the hopes they would breed, and their young return, in the vast woody dingles about the Breidden mountains; but with no success. Among my copious, but desultory and undigested, notes, I find the following, dated June 14, 1812: —

"I am told that the nightingale has not unfrequently been heard in my neighbourhood; but though, from earliest infancy, I have ever been fondly and closely attentive to these matters, I have but twice had this gratification here. The first, in some meadows called the Links, just below my house, many years ago; but I was too young duly to appreciate the transient strains, to which my ear was directed by my excellent father: and last night, on my return from Oswestry, in some low ground, called the Rod Meadows. Many mistake the woodlark for this enchanting bird; probably from the sole circumstance of his nocturnal song; for surely there is not the smallest resemblance in the melody, though very sweet.

> 'The crow doth sing as sweetly as the lark,
> When neither is attended; and, I think,
> The nightingale, when he doth sing by day,
> While every goose is cackling, would be thought
> No better a musician than the wren.
> How many things by season season'd are,
> To their right praise and true perfection!'

Nay, I have even known the ignorant and inorganised aver the hurried and huddled notes of the eternally restless sedgebird [Currùca salicària *Fleming*], to be those of the nightingale! I cannot be mistaken, having so constantly heard the nightingales in Bagley Wood, near Oxford; and, once heard by a duller ear than mine, they and their notes are not likely to be forgotten. They seem to love low meadows and bushy grounds. I stopped a full half hour last night in the road, during which he scarcely ceased singing; from the low and quickly repeated gurgling note, to his full flow and rich gushes of lofty melody; with short but lovely pauses, doubling the effect of the resumed and reiterated strains. It was a moonless night, but refreshingly mild, and fragrant with the odours of woodbines and hedge-flowers, while the glow-worm shone sweetly on the bank."

Much, however, as I lament that the visits of this bird are so few and far between, I would not give up the blackcap for him; of all our English warblers, to my taste, the most ravishingly sweet, wild, and wonderful. As the Scotch say to the Irish, when the latter pretend a claim to Ossian, "Well, take him if ye can: we have Robert Burns for our own!" So I say of my beloved blackcap: he is the Burns of birds. And really often, Sir, when musing alone (though I may be laughed at for telling it, and I care not), delightfully startled at his sudden burst of ecstatic song, I exclaim aloud, "God bless thy merry heart!" and I find I have long ago written opposite him, on the margin of my Ray, "Avium poeta, et omni modulamine amplissimus." *

The finely tuned ear of our darling White duly felt the music of this bird, when he gives it the numerous and just epithets of "a full, sweet, deep, loud, and wild pipe." He has not only, too, a perfectly original style of his own, though, like a poet of all-genius, he sometimes hardly knows what he is about, and has (regardless of Aristotle and the unities) neither beginning, middle, nor end; but is an eminent and most successful imitator of many other birds, particularly of

* "Poet of birds, and fullest of all song."

the thrush and swallow, even to deception, if not seen; and, like the mightiest of bards, will, from his highest flights, suddenly break off into his *chat*, *chat*, *chat*, of homeliest prose.

I find, in my notes of 1819, that very early, one April morning, in bed, with the sash open (for I frequently, on fine nights, place an Æolian harp in my chamber window), I imagined I heard a nightingale in full song. I rushed out half-dressed and slipshod to the thicket, where the fine strains still flowed by fits, and distinctly saw it was my friend the blackcap; which, had I not seen, I should have believed to have been a nightingale, so full, thick, rich, and loud were the many modulated notes. They were not repeated the next morning. Might not this blackcap, in his passage through the south of England, resting in the night, have heard a nightingale, and retained in his memory parts of the song?

The good and honest old Izaak Walton, with the finest spirit of that faith he sincerely believed and felt, thus honours the nightingale: — "But the nightingale, another of my airy creatures, breathes such sweet loud music out of her little instrumental throat, that it might make mankind to think miracles are not ceased. He that at midnight, when the very labourer sleeps securely, should hear, as I have very often, the clear airs, the sweet descants, the natural rising and falling, the doubling and redoubling of her voice, might well be lifted above earth, and say, 'Lord, what music hast thou provided for thy saints in heaven, when thou affordest bad men such music on earth?'" The Latin scholar of taste may be highly gratified with a masterly description of the nightingale's song, on referring to the *Natural History of Pliny*, book x. chap. 29., which I will not expose my pedantry by quoting, nor my clumsiness by attempting to translate. It begins about the middle of the chapter, "Lusciniis diebus ac noctibus continuis ..... densante se frondium germine," &c. &c., and is a rich masterpiece of brilliant composition.

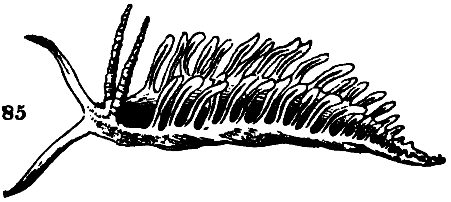
Mind, I am not writing a history of these birds, or I should never know where to end; but merely a *chit chat* sketchy scrap, for the lighter readers of the Magazine, who prefer the poetry of natural history to the dry and draffy multiplication-table nomenclature of technicalities, and the concatenated articulations of inductiveness. I leave these to the learned. I never loved to deal in the *nugæ difficiles*, [puzzling trifles], though, I fear me, like poor Dogberry, I am sometimes guilty of "letting my reading and writing appear, when there is no need of such vanity." I had lately an inkling to have offered you some remarks on many of our warblers' melodies, and the language of birds, both their poetry and prose: but it has been so ably and admirably commenced by a gentleman [Mr. Main] so very far more competent (Vol. IV. p. 118. and 412.), that I will not even presume to play a second; but leave him with a *Tasto solo*, ad libitum; praying him to proceed as he has begun; most honestly confessing my far greater pleasure in enjoying his acute and well-defined notes, than seeing in print my own inferior accompaniments.

May 1. 1832. John F. M. Dovaston.
Westfelton, near Shrewsbury.

Art. VI. *Illustrations in British Zoology.* By George Johnston, M.D., Fellow of the Royal College of Surgeons of Edinburgh.

4. E'olis rufibranchia'lis. (*fig.* 85.)

Cl. Gasterópoda, Ord. Nudibránchia, Fam. *G*laúcidæ, Gen. E'olis.



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The genus E'olis, Eólida, or Eolídia, (for thus variously is it written,) was established by Cuvier, when this great master in natural science first undertook to give to molluscous animals an arrangement, in which the various families should stand according to their relations, as indicated by their structure and habits, and which, in its practical application, has as much facility as the most incongruous methods of any of his predecessors. The genus embraces such naked sea-snails as have two or three pairs of conical non-retractile tentacula at the head; and external branchiæ, in the form of tapered slightly compressed filaments or papillæ, disposed in one or more rows along the back. The skin covers the body closely, and nowhere assumes the form of a cloak; and the little creatures move along solely by the undulations of the foot, which, like that of the slug, forms the entire under surface.

In illustration of the genus, I select a species which, it appears to me, has not hitherto been described, and which may be distinguished by the following character: —

E. rufibranchiàlis. — Corpore limaciformi, albido; filamentis branchialibus numerosis, longis, coccineis, apice albis; tentaculis quatuor.

E. rufibranchiàlis. — Body snail-like, whitish; branchial filaments numerous, long, scarlet, tipped with white; tentacula four.

This new E'olis was found creeping on some corallines dredged up in Berwick Bay. The body, when fully extended, is half an inch long, whitish, somewhat transparent, soft, oblong, tapered behind; branchial filaments slightly tapered, disposed in two interrupted rows along the margins of the back; sides white, smooth; foot narrow, white; tentacula white, conical, the superior rather shorter and wrinkled, the inferior more slender and smooth; eyes two, extremely minute, placed at the base of the superior tentacula. The branchial filaments are unequal in length; they are carried erect when the animal creeps in the water, but fall down on its sides when removed from it. Each filament consists of a red central part, which is enveloped in a transparent soft skin or coat; and the white tips appear as if they were perforated.

Our figure exhibits the animal considerably magnified; for in such minute creatures as these are, figures of the natural size are of no utility.

Berwick upon Tweed, March 18. 1832.

CORRECTION to the Name of the Species of Planària described p. 344—346. — The recovery of a long lost note-book has enabled me to ascertain that the subject of my last illustration is the Planària vittàta of Mr. Montagu (*Lin. Trans.*, vol. xi. p. 25. tab. 5. fig. 3.). The differences which may be remarked in our descriptions proceed evidently from their being taken from the animals when in different states of repletion. Montagu, therefore, is the discoverer of this species in Britain. His specimens were found on the coast of Devonshire; and Dr. Fleming has also seen it in the north of Scotland.

ART. VII. *On the Varieties of Pàris quadrifòlia, considered with respect to the ordinary Characteristics of Monocotyledonous Plants.* By the Rev. J. S. HENSLOW, A.M., King's Professor of Botany in the University of Cambridge.

THE flowering stems of Pàris quadrifòlia (*fig.* 86. *a*) bear one whorl of leaves, and four whorls in the floral organs; and in the most common state of the plant these whorls are respectively composed of four leaves, four sepals, four petals,

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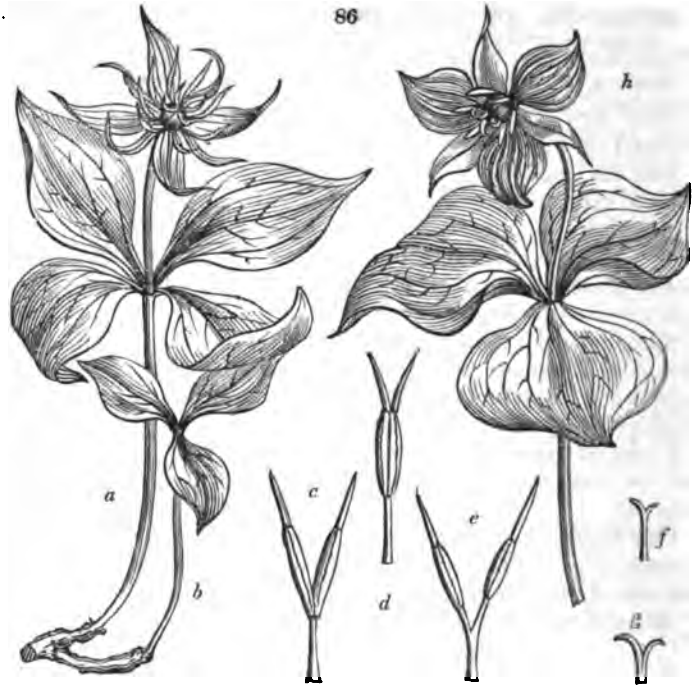

eight stamens, and a four-celled pistil, crowned by four stigmas. In this state, therefore, it offers a marked exception to the law which is so prevalent among monocotyledons, "that the number 3, or a multiple of it, should prevail in the developement of some part or other of their structure."

The frequency, however, with which this plant deviates from its more common condition, seems to indicate a great degree of instability in the operation of whatever be the law which regulates the developement of its subordinate parts; which should make us cautious in pronouncing upon the normal condition of its several foliaceous whorls. It seems to me that some light may be thrown upon this question by examining a great number of specimens from different localities, and recording the *limits* within which the number of parts in each organ is found to vary. With this view, I have, for the last three or four years, noted the different varieties gathered by myself and two friends, Messrs. Babington and Downes, in a habitat near Cambridge. The result of our examinations, made upon 1500 specimens, I have arranged in the following tables, upon which I shall offer a few remarks.

Table I. — The condition and number of each, of 38 distinct varieties observed among 1500 specimens.

Variety.	Leaves.	Sepals.	Petals.	Stamens.	Stigmas.	Number of instances of each variety.	Variety.	Leaves.	Sepals.	Petals.	Stamens.	Stigmas.	Number of instances of each variety.
1	3	5	3	8*	4	1	21	5	5	4	8	4	1
2	4	3	3	6	3	1	22	5	5	4	9	4	10
3	4	3	3	7	3	2		5	5	4	9	4*	1
4	4	4	3	7	4	3	23	5	5	4	9	5	1
	4	4	3	7*	4	1	24	5	5	4	9	6	1
5	4	4	3	8	3	2	25	5	5	4	10	4	1
6	4	4	3	8	4	2	26	5	5	4	10	5	1
7	4	4	3	9	4	1	27	5	5	4	11	5	1
8	4	4	4	8	3	4	28	5	5	5	10	5	6
9	4	4	4	8	4	1160	29	6	3	3	7	4	1
	4	4	4	8*	4	3		6	3	3	7*	4	1
	4	4	4	8	4*	1	30	6	3	3	8*	4	1
10	4	4	4	8	5	12	31	6	4	3	8	4	1
11	4	4	4	9	4	19	32	6	4	4	8	3	1
12	5	3	3	7	3	1	33	6	4	4	8	4	1
13	5	3	3	7	4	1	34	6	4	4	8	4	12
14	5	4	3	7	4	2		6	4	4	8*	4	2
15	5	4	3	8	4	2		6	4	4	8	4*	1
16	5	4	4	8	4	192	35	6	4	4	9	4	4
	5	4	4	8*	4	2	36	6	4	4	10	4	1
17	5	4	4	9	4	31	37	6	4	4	9	4	1
18	5	4	4	9	5	1		6	5	4	9	4*	1
19	5	4	4	10	4	3	38	6	5	4	10	4	1
20	5	5	3	8	5	1							

Table II. — Exhibiting the number of times that the several variations in each whorl occur throughout the whole number of specimens.

Num. of parts.	3	4	5	6	7	8	9	10	11	12
Leaves -	1	1211	259	29						
Sepals - -	8	1464	28	0						
Petals - -	24	1470	6	0						
Stamens -	—	—	—	1	12	1402	71	13	1	0
Stigmas -	11	1465	23	1						

Table III. — The numerical proportion between the most common condition of the several whorls (as in No. 9.) and the other cases, in which their several parts are either increased or diminished.

	Leaves.	Sepals.	Petals.	Stamens.	Stigmas.
Parts diminished	1	8	24	13	11
Ordinary state -	1211	1465	1470	1402	1465
Parts increased	288	28	6	85	24

In Table I. an asterisk (*) is placed against the number of the stamens and stigmas in some subvarieties, in which one of these organs exhibited a tendency to subdivide, or become double: by a filament bearing two anthers (*fig.* 86. *c*, *d*, *e*) or by a stigma becoming branched (*f* and *g*). By this table it appears that the most common variety (No. 9) exceeds three fourths of the whole number of the specimens examined; and that No. 16, next in abundance, which differs from it only in having one leaf more, comprises more than half of the remainder. Together, these two varieties exceed nine tenths of the whole.

By Table II. we are shown the *limits*, within which the number of parts developed in the separate whorls may lie: and it is very remarkable that these limits are so nearly 3 and 6 for the four whorls of leaves, sepals, petals, and stigmas; and that they are nearly 6 and 12 for the whorl of stamens. There are, in fact, only three varieties wanting out of the twenty-three which such conditions would render possible, and these deficiencies are confined to the non-occurrence of the highest limits assumed for the sepals, petals, and stamens. It should be remarked, also, that although a single instance only has occurred, in any of the flowering stems, in which the first whorl was composed of three leaves, this number, however, is very general in the foliaceous whorl that crowns the barren stalks (*b*).

Table III. is only a slight modification of Table II., but shows us a little more clearly what is the tendency of each whorl to deviate, by excess or default, from its most common condition.

Supposing, now, by way of hypothesis, we assume the normal character of the plant to be, that it have its several whorls composed of the minimum values which have been observed in the numbering of their separate parts, we should reduce it to the state of a Tríllium (*h*), an allied genus, which affords as excellent an example of the law of subdivision prevalent among monocotyledons *, as the usual state of Pàris quadrifòlia is a remarkable exception to it. If we would now attempt to account for the reason of such an anomaly, we may suppose that this plant is ever struggling, as it were, to become double in all its parts; but that it seldom succeeds, except in the case of the leaves, in subdividing and developing any more than *one* of the subordinate parts of each separate whorl. If each part were split up into two, by the sort of process exhibited in *fig.* 86. *c* to *g*, the plant would then acquire the maximum of developement indicated by the law suggested from Table II. But if, on the other hand, we assume that these maximum values belong to the normal condition of this Pàris, we have still a monocotyledon regularly subdivided into multiples of 3; only now we must ascribe its ordinary character to a constant tendency to abortion in the separate parts of each whorl. Which of these two hypotheses, or whether either of them, may be correct, it would be premature to decide. I shall, however, be very happy in finding any of your correspondents inclined to assist me in the investigation, by constructing similar tables from specimens procured in different habitats. I would, however, suggest an improvement in the mode of making these observations, which did not occur to me before, viz. to estimate the number of parts in the innermost whorl (or pistil of the flower), from the number of *cells* in the ovarium, and not from the number of the stigmas. Whenever there are more stigmas than cells, an asterisk may then be placed against the subvariety, as in Table I., indicating a tendency in some part of this whorl to become double. I am, Sir, yours, &c.

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* "That the number 3, or a multiple of it, should prevail in the developement of some part or other of their structure." In the genus Tríllium, as the term trillium implies, the parts are all triple; the leaves are 3; the sepals (leaflets of the calyx) 3; the petals 3; the stamens 6, that is, twice 3; the stigmas 3; and the cells of the berry 3. (See *fig.* 86. *h* above.) The primordial veins, too, of the leaves, sepals, and petals, both of the species of Tríllium and of Pàris quadrifòlia, are usually three. The species of Tríllium are all natives of America, where more than thirty species, it is said, have been discovered; out of this number thirteen species have been introduced into British gardens. The figure above (86. *h*) represents Tríllium eréctum *L.*, and is copied from t. 470. of Curtis's *Botanical Magazine*. — *J. D.*

Cambridge, Feb. 4. 1832. J. S. HENSLOW.

IN Vol. IV. p. 446–7. is a list of the rarer plants of Essex; and J. G., its author, remarks: — "In the Thrift Wood, near Chelmsford, Pàris quadrifòlia thickly covers the sloping sides of a pond (which is filled with *Hottònia* palústris), and grows to an unusual size: many of the specimens have five leaves." This remark suggests some connection between a vigorous condition of the plant, and the production of a fifth leaf.

Gerard Edwards Smith (of St. John's College, Oxford), in his *Catalogue of the Phænogamous Plants of South Kent*, states that he met with several specimens of Pàris quadrifòlia, precisely in the condition of Professor Henslow's twenty-eighth variety above, in a wood at Stowting; and adds that he found such specimens to be severally furnished with a 5-celled seed-vessel. Of one of these specimens he figures, in plate i. of his *Catalogue*, a flower, to exhibit the quinary division of its parts, and gives beside it a detached figure of the 5-angled 5-stigmaed germen, and another of a transverse section of it, for the sake of displaying the 5 cells of which it consists, and that one of these cells is larger than the remaining 4, as it is remarked to have been in the explanatory description.

Sir J. E. Smith, in Rees's *Cyclopædia*, describes two species of Pàris; one, our English P. quadrifòlia; the other, a species from Nepal, which he denominates P. polyphýlla. His entire description of it is here presented: — "P. polyphýlla, Many-leaved herb Paris. Leaves lanceolate, 8 or 10, Discovered by Dr. F. Buchanan, growing in woods near rivulets, in Upper Nepal, where it is known by the name of Dai Swa. The root is creeping, but much thicker and more tuberous than in P. quadrifòlia. Stem a foot or more in height, brownish, thrice the thickness of that of P. quadrifòlia, crowned like that with a whorl of leaves, in a similar spreading position, but about twice as numerous, and much narrower, being elliptic-lanceolate, taper-pointed, triple-ribbed; each supported on a short purplish stalk. Flower-stalk much shorter than that of P. quadrifòlia, but the flower is larger, of the same green colour. Its calyx leaves and petals are usually 5, with ten stamens; but sometimes only 4 with 8 stamens; or even 3 with 6. The styles, as well as the cells of the germen, always agree in number with the petals; but the former are combined by a thick columnar base, which character, added to his not having seen the ripe fruit, caused Dr. Buchanan to doubt of the genus. The habit and rest of the characters, however, leave no scruple in our mind; but it is very possible that what Linnæus, in the European species, calls styles, may be almost wholly stigmas, for they are downy all along their upper side, and the Nepal plant will then be found to differ merely in having the style more elongated."

Sprengel, in his *Systema Vegetabilium* (vol. ii. p. 261.), registers the following species of Pàris : —

" 1. P. quadrifòlia *Linn.* Leaves 4, in a whorl, sepals linear, exceeding the petals in length. Inhabits the shady woods of Europe.

" 2. P. verticillàta *Bieberstein.* Leaves 8, in a whorl, sepals lanceolate, thrice as long as the petals. Inhabits the east of Siberia and Nepal. [Synonyme:] P. polyphýlla of *Smith.*

" 3. P. incomplèta *Bieberstein.* Leaves about 10, in a whorl, sepals lanceolate, nerved; petals none; anthers not lengthened out at their tips. Inhabits Armenia and Iberia. [Synonymes:] P. apétala and Demidòvia polyphýlla [both of] *Hoffmann.*"

This quotation from Sprengel informs us of the existence of at least two species of Pàris, which individually produce a whorl of about 9 leaves; and should Sprengel, in his haste, have wrongly identified Bieberstein's P. verticillàta from the east of Siberia, with Smith's P. polyphýlla from Nepal, then three species will be known which severally produce a whorl of about nine leaves.

Has any one, by night or by day, observed the flower of Pàris quadrifòlia to be fragrant? Its green colour suggests the likelihood of its being fragrant, as does the fact that the flower of Trìllium díscolor *Wray*, a species native to Georgia in America, and figured in Curtis's *Botanical Magazine*, t. 3097., is described to exhale an odour resembling that of the blossoms of the American allspice (Calycánthus flóridus). These are fragrant, indeed; for when numerously expanded, in the sunny days of July, their usual time of flowering, they diffuse a copious volume of delicious and aromatic odour, capable of perfuming the surrounding air for many yards. — *J. D.*

ART. VIII. *On the recent Discovery of Gold Mines in the United States of America.* By ROBERT BAKEWELL, Esq.

Sir,

THE discovery of native gold in some of the southern provinces of the United States in North America has not hitherto excited much attention in Europe, though the quantity obtained has for several years supplied the greater part of the gold coined at the mint of the United States' government. The principal part of the gold has been procured from the states of North and South Carolina and Georgia. It was first discovered in considerable masses in the sands of rivers; one mass was found weighing 28 lbs.: it has more recently been found occurring in regular veins intermixed with the minerals which are usually associated with gold ores in other localities. Dr. Macauly, an American gentleman who is connected with several extensive proprietors of land in which gold occurs, visited England this spring, and obligingly invited me to examine the specimens he had brought with him, and subsequently presented me with various specimens of the ore and the rocks in which the gold veins occur; among which is one highly interesting specimen of a vein, rich in ore, with a portion of the rock attached to each cheek or side of the vein. The occurrence of gold in considerable quantities, in the midst of the oldest settlements of the United States, is a fact not only interesting in the natural history of those States, but is one which cannot fail to produce important effects on their commercial relations. The following brief description of the North American repositories of gold ore, communicated to me verbally by Dr. Macauly, will, I trust, be acceptable to many of your readers; I shall add to it an account of the specimens he has given me, illustrative of the geology of the gold districts.

To make the account more generally intelligible, I shall first take a summary view of the geology and physical structure of a portion of the United States extending from the sea coast to the ranges of the long chain of the Alleghany Mountains, which separate the rivers that flow westward into the Atlantic, from those which flow southward into the Gulf of Mexico. The range of sea coast from the south of Georgia to Long Island takes a north-easterly direction; and the ranges of the Alleghany Mountains, in the interior, run nearly in the same direction, which is also that of the different beds of rock that occur between the sea and these mountain ranges. The traveller who lands upon the coast between latitude 30° and 42°, and advances westward, will have to pass over a vast extent of sand and gravel, with masses of loose rock and clay beds, composing what may be called the alluvial and diluvial deposition; or, what are by the French more properly termed *terrains de transport;* viz., lands formed of the debris or ruins of the more solid parts of the earth's surface, and carried into their present position by inundations from the breaking down of lakes, or the irruptions of the ocean. These diluvial depositions for the most part cover the solid rock for the breadth of 100 miles, or more, inland from the coast. When the traveller has passed over the diluvial districts, and arrives at regular beds of rock ranging north-east and south-west, he will not find them composed, as on the eastern side of England, of the upper secondary or tertiary formations; but he arrives at what geologists call a primitive and transition country, like that on the western side of England, Wales, and Scotland. In this part of the United States, the primitive and transition rocks are not elevated into lofty mountains, but form ranges of hills of very moderate elevation; and the granite, wherever it appears, is a low ridge, destitute of those grand features which characterise granitic mountains in many parts of Europe.

In Dr. Maclure's account of the geology of the United States, he describes the granitic ridge as immediately bordering the alluvial and diluvial land; but according to Dr. Macauly, the granitic ridge that runs through Georgia and the Carolinas is situated several miles west of the border of the alluvial depositions, and the gold veins occur in the low hills that rise between this ridge and the diluvial land extending north and south through these states. The gold districts which have been hitherto examined occupy a surface of above 200 miles in length from north to south, and a breadth varying from 20 to 30 miles or more. From the specimens given me by Dr. Macauly, the rocks are evidently what are denominated transition rocks, and rocks allied to the older trap formations. As we proceed beyond the gold districts, the beds generally dip westward; and are at length covered with secondary rocks of sandstone and limestone, and include a part of the great coal formation, extending to the north-west beyond Pittsburg. It is the older secondary strata, that, rising in various ridges in a north-east and south-west direction, have received various names in the different states; but which, for conciseness, I have designated by the common name of the Alleghany Mountains: their course may be seen traced in all the best maps of the United States. This outline of the country may suffice to convey a tolerably correct notion of the geological position of the gold districts.

It is now more than twenty years since native gold was first discovered in the sands of some of the rivers in North Carolina. One mass was found weighing 28 lbs. So early as the year 1810, nearly 1400 oz. of this gold were received at the mint of the United States. On a more extended search, gold was found afterwards in grains and small pieces, in the dry sands of many rivulets in both the Carolinas, and also in Georgia. Indeed, it is rather extraordinary, that, in countries which had been so long settled, native gold should occur in considerable quantities, without exciting the attention of the inhabitants; particularly as it preserves its colour and splendour, being for the most part nearly pure. For some years after gold had been discovered in these states, the inhabitants were contented with searching the beds of brooks and rivulets, after heavy rains had subsided. But one proprietor of land in which gold was obtained, having noticed that the sands of a rivulet, on his estate, never yielded gold above a certain point, where a small brook entered into it, was induced to believe that the gold had been brought down by that brook. On tracing it upwards to its source, he observed in the adjacent rocks several veins of quartz; and recollecting that some of the grains of native gold found in the sand were attached to pieces of the same mineral, he very naturally inferred that the gold might be contained in these veins. After three or four days' labour; in sinking upon the vein, he was rewarded by the discovery of several bunches, or united pieces, of native gold. This successful experiment was soon followed by others of a similar kind, carried on in a rude manner by the American farmers, with little knowledge of mining operations, and without any acquaintance with geology or mineralogy. By these means, and by searching the sands of rivulets in the districts before described, a large quantity of gold has been annually obtained; but the veins have been nowhere worked deeper than about 40 or 50 ft., when the workings have in many situations been impeded by water; to remove which required more skill and capital than most of the proprietors possess. One farmer, who had obtained by his own labour gold to the value of 25,000 dollars, immediately relinquished the pursuit when the water came into the mine; being unwilling, as he said, "to throw away certain gains in the search of uncertain profits." Some American gentlemen, resident in and near the gold districts, have formed a company for the purpose of working the mines on a more extensive scale, and in a scientific manner: they have purchased 22,000 acres of land, containing auriferous veins, and have obtained a charter from the government of the state of North Carolina. It was for the purpose of inducing some English capitalists to unite with them, that Dr. Macauly visited this country; and, the amount of capital required being comparatively small, he found no difficulty in meeting with persons willing to unite with the company, on the condition of previously examining their estates.

As these mines have now been worked some time, and are situated in a well inhabited country, provided with good roads;

navigable rivers, and wood, they offer a fairer promise for British enterprise and capital, than any of the mining speculations in South America, many of which are situated in almost inaccessible positions, far removed from supplies of food or fuel, where the working must be attended with enormous expense, and where, from the instability of the government, the proprietor can have little security for the permanent possession of the mines, should they prove productive. Whether the Carolina Gold Mine Company have selected for their operations the lands which will ultimately be the most productive in valuable gold mines may be fairly doubted, as the gold districts cover so large a portion of the country, and have not yet been diligently and scientifically explored. The selection has, most probably, been as well made as the present state of information would admit of. The specimens of native gold which Dr. Macauly brought to England were very numerous: those from the sands of rivers consisted chiefly of gold nearly pure, and were generally unmixed with other minerals; the pieces were somewhat flattened, and rounded, varying in size from that of a pea to a large walnut. The specimens of gold from veins were of various sizes, and more or less intermixed with quartz, steatite, calcareous spar, iron pyrites, and a reddish brown iron ochre, probably derived from the decomposition of pyrites. One was indeed a rich specimen, weighing about 7 lbs., of which about 5 lbs. were nearly pure gold. The specimen was much flattened, as if it came from the side or cheek of the vein. In a country like England, where gold, the representative of wealth, is most ardently adored as the supreme deity, "with all the heart, and with all the mind, and with all the strength" of its votaries, such a specimen was indeed a tempting object. In imitation of the fisherman at Athens, mentioned by Lucian, who with a rod and line angles for different philosophers from the tower of the temple of Minerva, baiting his hook with the objects best suited to the cupidity of each sect;—I say, in imitation of the Athenian fisherman, I recommend Dr. Macauly to bore a hole through his specimen, and with a rod and line suspend it from the gallery of the House of Commons, when he would soon have numbers flocking round, and catching at it; crying out, "Ay, that is the right stuff for us; that is the true bait for John Bull!" Dr. Johnson, esteemed our great moralist, says, of the influence of gold in England:—"Wealth commands the ear of greatness and the eye of beauty; gives spirit to the dull, and authority to the timorous; and leaves him, from whom it departs, without virtue, and without understanding."

To return from this slight digression to the drier subject of the rock specimens from the Carolina gold district: they are not numerous, but they suffice to show clearly the geological character of the country.

1. Clay slate, exactly similar to the varieties of Cornish slate provincially called killas; having somewhat of a whitish silvery lustre.
2. A quadrangular prism, of what Dr. Macauly called basalt: it occurred in a bed over the gold veins, and, according to Dr. Macauly, some parts of the bed contained garnets.* The prism more nearly resembles phonolite, passing into clay stone; it is of a greenish brown colour, very compact, but yielding without difficulty to the knife: each side of the prism has a steatitic incrustation, which gives it the aspect of serpentine, and the same soapy feel; but this is merely superficial.
3. A darker rock, more nearly resembling serpentine; it contains some embedded particles of quartz, and minute grains of pyrites, which are probably auriferous, as a vein of compact grey quartz runs through the rock, in which native gold is plentifully disseminated in particles and laminæ of various forms.
4. A magnificent specimen of splendent carbonate of iron, with white quartz, from near Salisbury, North Carolina.
5. A specimen of a vein containing quartz, iron ochre, iron pyrites, and particles of native gold, with portions of greenish slate and mica.
6. and 7. Iridescent coal from Mount Carbon in Pennsylvania.

The American coal formation extends from east to west several hundred miles, and contains numerous beds of valuable coal and ironstone: it will doubtless prove a far greater acquisition to the wealth and power of the United States than the discovery of gold. The coal is chiefly dry coal, yielding little bitumen: the Americans call it anthracite, but it is very different from the anthracite of European mineralogists, and is far more valuable for domestic use or for manufactures.

The discovery of the three important minerals, gold, iron ore, and coal, in a country possessing free institutions, with a cheap but effective government and an enterprising and enlightened people, presents to the reflecting mind objects for future anticipation of the most consoling kind. Persons who appear to hate the very name of republican freedom, pander to the feelings of a corrupt oligarchy, and visit America for the purpose of ridiculing the people, and vilifying their institutions; — they do not find, indeed, all the polish of manners which may be possessed by the metropolitan citizens of old established states: but, if such travellers were to visit our agricultural population in the provinces of England, I am sure they would meet with all the rudeness of the Americans, without even a slight degree of their general intelligence and good sense.

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* I think that these crystals were most probably analcime, a mineral commonly found in basaltic rocks, and frequently crystallised like the garnet.

The relative benefits of a cheap and a dear government may be learned by the following fact, immediately connected with the subject of the present communication. About the very time when native gold was discovered in Carolina, a similar discovery was made in the county of Wicklow in Ireland, and considerable quantities of gold were found in the mountain streams: among these was one specimen of pure gold weighing 22 oz., and another of 5 oz. On enquiring from my friend, General Cockburn, when on a visit at his house in the neighbourhood of the gold streams, what progress had been made in the farther discovery of gold, he informed me that the gold streams had been taken under the fostering care of government, and a guard of soldiers placed over them; since which time not one particle of gold had been heard of in the country.

I am, Sir, yours, &c.

ROBERT BAKEWELL.

Hampstead, May 12. 1832.

AT p. 454. of the present Number will be found some notices, sent us a considerable time ago, of several instances of the discovery of gold in the United States. Some short notices of diluvian deposits in the state of New York, and of the fossils found in those deposits, as well as a notice of the anthracite of Rhode Island, will be found in Vol. II. p. 253. — *J. D.*

REVIEWS.

Art. I. *Catalogue of Works on Natural History, lately published, with some Notice of those considered the most interesting to British Naturalists.*

Anon: Popular Lectures on the Vertebrated Animals of the British Islands. Part I. On the British Mammífera; with a tabular View of them, arranged according to Blumenbach's System; a Synopsis of all the Genera and Species; and an Appendix containing a Sketch of Extinct Animals. 8vo, pp. 96. Birmingham, 1831. Wrightson, Birmingham; Baldwin, and Longman, London.

The writer of these Lectures plays with his subject, that is, he discusses it in an off-hand manner; and although in his successive treating of the various animals, one by one, he gives, in English, the technical characteristics of each species, and those of the genus, order, &c., to which it belongs, he gives also, in relation to each, either some sentimental reflection, something interesting that has to his knowledge occurred in association with it, or anecdotes and notices descriptive of the habits of the animal. This untechnical part of the book we regard more than the technical part, because the British animals are to Britons empirically known or distinguishable; but it is, we fear, far from being the fact, that each is to every Briton a centre of amiable, intellectual, and therefore highly interesting, associations. This is what it is most desirable they, and every object in creation, should be; and we admire the present manual, as being a cheap means of promoting so desirable an end, and heartily wish that the successful sale of this "Part I." may encourage the author to proceed with the remainder, which he proposes should consist of six parts: "Parts II., III., and IV., to be respectively devoted to the description of the land birds, the Grállæ or waders, and the water birds; Part V. to the amphibious animals and cartilaginous fishes; and Part VI. to the osseous or bony fishes." We cannot state the price of this richly stored pamphlet, or "Part I.;" but it cannot be high, as it has been got up in a plain, unornamented, but nevertheless clear and neat, manner.

Anon: The Minstrelsy of the Woods; or Sketches and Songs connected with the Natural History of some of the most interesting British and Foreign Birds. By the Author of "The Wild Garland," &c. 8vo, pp. 230, with 19 plates of as many species of birds. London, 1832, Harvey and Darton.

This is a charming little volume, and well adapted to the purpose for which it is said to have been written; namely, the amusement and instruction of the youthful. The author does not pretend to be a scientific ornithologist; but he is a lover of the feathered race, and has studied their habits and economy with attention. Birds may be considered as the poets of the inferior creation; hence has arisen a kind of fellowship between our author and the choristers of the woods. He has described and sung of their characters, powers, instincts, and their affections, returning song for song, in a very pleasing strain. Although the execution of the plates and portraits of the birds are not every thing we could wish, yet they are sufficiently exact for identifying the species intended, more especially if they were coloured; and this we would advise every young lady who has a copy to do for herself, as a very pleasant task. But surpassing all he has said or sung are the amiable feelings and pious train of sentiment which pervade every page of the book. — *J. M.*

Weatherhead, George Hume, M.D. &c. &c.: An Account of the Beulah Saline Spa, at Norwood, Surrey; containing a Description of its Medicinal Properties and Effects, of the Diseases of which it is remedial, and Directions for its Use. 8vo, pp. 38. London, Hatchard, 1832.

"The water drawn fresh from the well is beautifully transparent and sparkling. Innumerable bubbles of fixed air are seen rising to the surface, when allowed to stand. Its taste is distinctly bitter, without being at all disagreeable, leaving on the palate the peculiar flavour of its predominant saline ingredient, the sulphate of magnesia. The temperature of the water at the bottom of the well is 52° of Fahrenheit; its specific gravity 1011; and, by an analysis of its composition by Faraday and Hume, the following are the solid contents, in grains, of a quart of the water: — Sulphate of magnesia, 123; sulphate of soda and magnesia, 32; muriate of soda, 19; muriate of magnesia, 18½; carbonate of lime, 15; carbonate of soda, 3: in all, 210½ grains." As a means of comparison, the saline contents of a quart of the Cheltenham pure saline, as analysed by Mr. Brande, are given: they are these: — hate of magnesia, 22; sulphate of soda, 30; muriate of soda, 100; sulphate of lime, 9: in all, 161 grains. This comparison, it is remarked, is exhibited, "to enable the reader to judge how much superior, as an aperient water, the Beulah spring is to that of Cheltenham."

Dr. Weatherhead's pamphlet describes, in a clear and popularly intelligible manner, the efficacy, and the reasons for the efficacy, of the Beulah saline spring, and all mild aperient saline waters, in mitigating or curing indigestion, liver and bilious complaints, jaundice, chlorosis, hypochondriasis, chronic and strumous ophthalmia, cutaneous diseases, unhealthy condition of the humours, constipation, and scrofula. Dr. Weatherhead appends to his remarks on the above subjects, which he discusses separately, very sensible "directions for drinking the waters, with remarks on diet, exercise, change of air, scene, and occupation."

Twenty-five acres of pleasure ground are attached to the Beulah Spa, and spirited exertions have been, and are being, made, to render these, in addition to the medicinal merits of the spring itself, truly deserving of the patronage of the public. Those who are already acquainted with the landscape and rural charms of the Norwood neighbourhood, will be gratified by this information of the heightening and embellishment, now in progress, of a portion of them.

Art. II. *Literary Notices.*

An Introduction to the Knowledge of British Birds, for Young Persons, by R. A. Slaney, Esq. M. P., is in the press, and will soon be published.

An Introduction to Botany, by Professor Lindley, is in a forward state of preparation, and will shortly be presented to the public.

A Zoological Description of the Oceanic Inhabitants of the Arctic Regions. — Professor Dewhurst, whose interesting paper on the whale at Charing Cross we had the pleasure to insert (pp. 214—233.), proposes to publish by subscription a volume bearing the above title, consisting of a series of observations made during his voyage in Greenland, in the year 1824, and illustrated by upwards of seventy engravings. In this work, the errors of Willughby, Ray, Pennant, Scoresby, Baron Cuvier, and Count Lacépède, are to be corrected. The author informs us, that owing to a severe and almost fatal illness, of five months' duration, from a dissection wound, he is unable to publish it himself. He will put it to press as soon as he can procure 100 subscribers.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Natural History in foreign Countries.*

FRANCE.

Fossil *Riches of Touraine.* — Sir, In that part of the ancient French province of Touraine which nearly adjoins Poitou, there exists a deposit of fossil remains; which, though not unique, is perhaps unparalleled, in extent and circumstances of peculiar interest, in natural history. This vast deposit the French call *Les Falunières*, which, according to M. Croïe d'Argenson, are spread over a district of country not less than twelve leagues square, measured by the French league, which consists of 2½ English miles. Certain it is, that it extends from near St. Maure, and from below Bossée on the south, to beyond Meutheme on the east; and from St. Maure, by St. Cathérine de Fierbois, in a northerly direction, to above Louhans, several leagues farther north. This extraordinary deposit consists entirely of fossil shells, in different states of preservation, but mostly broken down into a fine shell sand. The thickness of the bed (which, as far as it has been examined, appears to be uniform) has not been yet ascertained, though pits have been dug in it from 8 to 10 ft. deep; at which depth the water has been invariably found too abundant to admit of farther excavation without the aid of expensive machinery, which has never yet been applied. The shells and their debris [reduced fragments] are to be met with at about 2 ft. below the surface of the ground, and seem to lie in a horizontal position, nearly corresponding with that of the surface. Intermixed with the broken shells many fossils are to be found, some entire, and others in a more or less perfect state. Among those already met with are the *O*strea (rock oyster, in great variety of shapes and sizes, from half an inch to 6 in. long), Cardìta crássa, Turritélla, Cerìthium, Caryophýllia, *P*écten, Annulìtes, Pectúnculus pulvinàtus, Scutélla subrotúnda, &c. &c., and, near St. Cathérine de Fierbois, the fossil remains of teeth and palates of fish, of all which specimens in a high state of preservation have been obtained.*

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* Similar specimens of the latter of these singular fossil remains have ent me by M. de Chauchevrier, found in digging drains at his seat, distant from St. Cathérine de Fierbois.

No part of this extraordinary deposit of marine fossils approaches the sea nearer than from 130 to 150 miles; and, between, those primitive rocks intervene which geologists consider to be the oldest and the base of all other strata. The department of the Indre et Loire, which comprises the whole of the ancient Touraine, and parts of Poitou and the Orléannois, abounds with calcareous rocks, some of them mainly composed of fossil remains, and of different degrees of hardness: but in the fossils of the vast district of the *Falunières* there exists no principle of agglutination; so that, when exposed on the surface of the ground, they look like heaps of white sand, many of the particles of which are light enough to be moved by the wind. So striking a difference between the fossil deposit of *Les Falunières*, and those which surround and probably support it, is difficult to be accounted for; the fact, however, seems well worthy of distinctive notice in the geological map of France, as forming a most singular feature amidst the newer members of the *terrain secondaire* of Humboldt.

The value of these fossil remains as manure is better understood in England than in France: they are, however, beginning to be used in the immediate neighbourhood of *Les Falunières*, on the side of St. Maure, where the application of lime to the purposes of agriculture is nearly unknown: but the soil or subsoil of nearly the whole of the department being compounded, in some proportion or other, of chalk marl, limestone, or fossil remains, there is at one and the same time less occasion for it, and the less inducement to use it. Touraine (for centuries known by the appellation of "the garden of France") offers a rich subject for the study of natural history, a subject not the less inviting for having been hitherto most unaccountably neglected. In the cabinet of natural history, over the gallery of paintings at Tours, there is a tolerable collection of the fossils of this truly extraordinary calcareous district; for which the public is chiefly indebted to the liberal donations of M. Louirette, and the recent additions made to it by M. Dujardin, the talented professor of chemistry in that city. To both those gentlemen, but most particularly to the latter, as well as to Captain Ridgeway, then resident at Tours, I am much indebted, not only for some fine specimens which I probably should not otherwise have obtained, but for assistance and encouragement in the pursuit of a science of which I previously knew little or nothing, in which I am still only a learner, but from the study of which I found an invaluable source of amusement, wonder, and delight, during a sojourn of six months in "the garden of France;" in the course of which time, I was perpetually and practically reminded of the truth and beauty of the following passage, in Mr. Brande's *Dissertation on the Progress of Chemical Philosophy:* — "The phenomena of the universe present a series of changes of which the regularity and harmonious succession excite the surprise of superficial observers, and awaken the admiration and attention of the philosophical mind. These changes are either accompanied by visible motion susceptible of measurement, and relate to the exterior forms and mechanical characters of bodies; or they depend upon the mutual agencies of the elementary principles of matter, upon its composition, or upon its susceptibility of acquiring new properties, by entering into new combinations." — *John H. Moggridge. Woodfield, Jan.* 2. 1832.

Singular Subsidence, with a Fossil Stag's Horn, in the Chalk Measures near Meredon, France. — Sir, Having become acquainted with the singular instance of subsidence portrayed in the annexed sketch (*fig.* 87.), together with others, during late researches in France, I send it you, accompanied by

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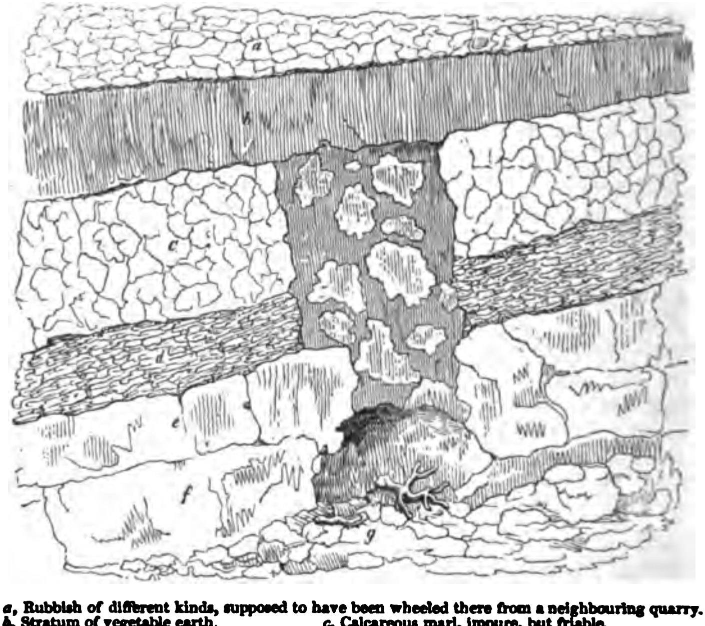

a, Rubbish of different kinds, supposed to have been wheeled there from a neighbouring quarry.
b, Stratum of vegetable earth.
c, Calcareous marl, impure, but friable.
d, Chalk, compact, and in small fragments, wrapped in yellow clay.
e, Stratum of compact marl, approaching chalk, in large masses.
f, Chalk, with its ordinary accompaniment of flints.
g, Fossil stag's horn.

explanations, in the hope that you may deem it worthy of publication. I am, Sir, yours, &c. — *John H. Moggridge. Woodfield, Feb.* 1832.

RUSSIA.

Longevity in Russia. — It is in Russia, much more than in any other country, that instances of longevity are not only more numerous, but also the most remarkable. In effect, in the report of the Holy Synod, published in 1827, we find that during the year 1825, and only among those of the inhabitants of the empire who profess the Greek religion, 848 men reached upwards of 100 years of age. Of this number 32 had passed their 120th year; four from 130 to 135. Out of 606,818 men who died in 1826, 2785 were above 90; 1432 above 95; and 818 above 100 years of age. Among this last number, 88 were more than 115; 24 more than 120; 7 were above 125; and 1 had attained the age of 160. (*French Paper.*)

ASIA.

A Mode of Fishing in China. — Among the many amusing scenes which strike the eye of a European, on his first visit to China, is the ingenious mode of fishing which he sees practised in the neighbourhood of Canton.

At the stern of their little punt-like boats, a small mast like a flagstaff, about 8 ft. high, is fixed. To the top of this, a block is made fast, having a sheave to carry a 1½ in. rope. One end of this rope is fixed to a bamboo pole 12 or 15 ft. in length, and which is hoisted higher or lower according as it is wanted. The but end of the pole is kept inboard; and at the other end a light net, about 8 ft. square, is slung; being kept distended by two slender rods, fixed diagonally to the opposite corners, and bound together in the middle where they cross each other; and where, also, they are fixed to the end of the swinging-pole before mentioned. (*fig.* 88.) A stone is thrown into the middle of the net to assist it in sinking, so that it may be, when down, spread out on the bottom

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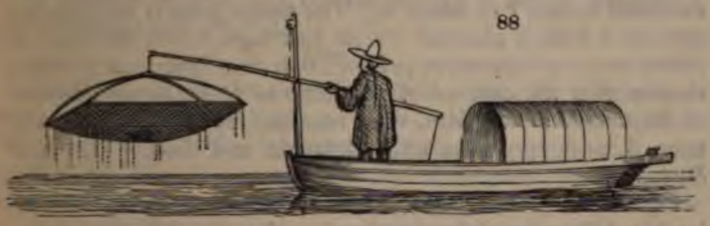

of the river. When the fisherman thinks any fish are passing over the net, he suddenly hoists it above the water; and if he has made a capture, he swings the net inboard to take out the fish; if none are caught, the net is dropped again in the same or some other place.

Success in this method of fishing depends on the knowledge of the fisherman as to the haunts of the fish: its special advantage is its being managed by one person, like a casting-net, but with much more personal comfort to the man. It is also preferable to any other mode in that part of China; because the fisherman can pursue his calling among the tiers of junks (barges), which crowd the river opposite the city; or in any creek or canal, where drawing-nets would be useless. It is, moreover, favourable to the custom in that country of exposing all their fresh fish alive in the markets.

This plan might be useful in this country for carp-fishing, in ponds having steep and rugged banks. By taking advantage of a tree, to which the pole and net may be slung, lowering it in the daytime, and throwing thereon a handful of brewers' grains or other bait, at night the fish would come to feed; and if then the net were cautiously approached, and quickly hoisted, a fine haul might be taken. Eels might be so taken in rivers, were the net sunk with a heavy piece of garbage.—*J. M.*

The Divi Ladner is the Tabernæmontàn*a* alternifòlia of botanists (*fig.* 89.), and Eve's apple of the descendants of the Portuguese in Ceylon. The name applied to this tree by the latter people originates in the tradition which prevailed in former days, among the Mahometans and the Portuguese, that Ceylon was the paradise described in the Scripture; that the garden of Eden was situated in it; and that the fruit of this tree was the forbidden fruit of which Eve eat a piece. In confirmation of this tradition, they referred to the beauty of the fruit, and the fine scent of its flowers, which are most tempting; and to the circumstance of the fruit having been excellent before Eve tasted it. The shape gives it the appearance of a fruit, a piece of which had been bitten off; and its effects are so poisonous at present, that two European soldiers, shortly after the capture of Colombo in 1795, being unaware of the nature of the fruit, were tempted by its appearance to taste it, and very soon after sickened and died. — *Sir A. J. Sept.* 1827.

Our woodcut has been executed from a drawing sent us by Sir Alexander Johnston; and, although it in all probability accurately exhibits the general character and aspect of

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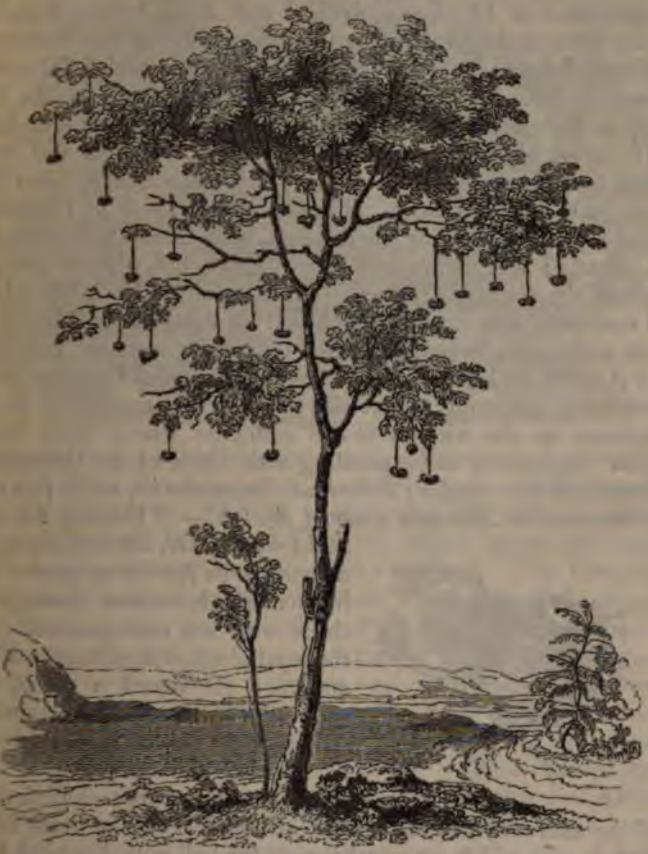

the tree, we are apprehensive, from what botanical references we have been able to make, that the peduncles of the pendulous clusters of fruit are represented of a length exceeding their natural one. — *J. D.*

AFRICA.

Swallows in Africa. — "I cannot quit the subject of ornithology without stating, that Adanson in 1783, and M. Afzelius in 1793, informed me that they saw *H*irúndo rústica, the former near the colony on the river Senegal, and the latter at Sierra Leone, in that time of the year when it is absent from Europe: Adanson desiring me to let Barrington know that l'hirondelle was the French name for *H*irúndo rústica. Mr. Tudsbury of Chesterfield, who resided at Sierra Leone and Rio Nunez from 1821 to 1828, as agent to a mercantile house in London, informs me, with English specimens of *H.* rústica, úrbica, and *Ápus* before him, that it is seen all the year in the neighbourhood of Rio Nunez and Sierra Leone; but that they are less numerous in the rainy season, from June to September. They inhabit rocks from 80 to 90 miles from the coast, flying about rivers and lakes. He never observed any on the sea shore. Neither did he see any nests or eggs. The natives never shoot them; but they are pursued by hawks. Thunberg saw them in September and October, building their nests, soon after their arrival in Caffraria; whence he says they migrate, but whither the people of the country are unable to ascertain. From the above, I conclude that it is an inhabitant of both extremities of the old continent; breeding in the temperate regions from June to August in Europe, and in September and October at the southern extremity of Africa: both sets migrating to the equator in the winters of the countries where they breed, their migrations corresponding with those of the thrushes of Scandinavia." (*Stokes's Botanical Commentaries*, vol. i. p. xxiii.)

Scarabæ̀us Ateùchus sàcer. (*fig.* 90.) — "During the first night watch, Dr. Ehrenberg found a Scarabæ̀us Ateùchus sàcer; and his account is curious enough for those who are unacquainted with the mythological significance of this animal. He heard a noise, and soon afterwards discovered in the dark a great rolling ball. He expected to find a hedgehog or tortoise, but it was only a ball formed of the excrement of the horse. Behind it was a great black Scarabæ̀us, which was pushing on the ball with his hind legs. The ball, from its rolling in the sand, became soon so large that, from the juxtaposition, the Scarabæ̀us appeared most insignificant in size. It is well known that the Egyptian priests believed the Scarabæ̀us to come forth from the excrement of a bull; which, being hidden twenty-eight days under ground, was supposed to produce the *kantharos* without the interference of a female. Hence the Scarabæ̀us became a symbòl of various import. *Descript. de l'Egypte Ant.*, vol. ii. p. 413." (*For. Rev. and Cont. Misc.*, Oct. 1828.)

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The Fezzan Ram. — The ram, of which an accurate representation is subjoined (*fig.* 91.), was imported by Mr. George Davis into New York, in the year 1810, on his return from Tripoli, where he had been consul for the United States. The ram was tall, and his long legs were covered with short hair; he had two spiral horns, which were small for a male of his size.

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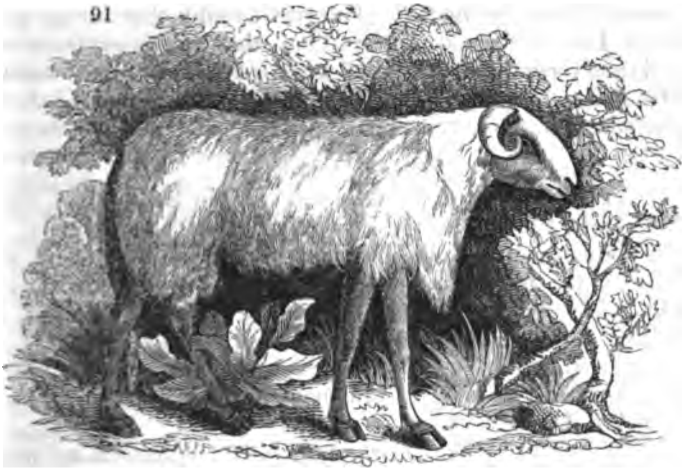

His front had a noble aquiline curve; there was a considerable tuft of his coating below his throat, and near his breast, with fawn-coloured and dark spots about his face and ears. The tail was slender, reached several inches below the heel, and was covered with short hair like the legs. The covering of the body was white hair, beneath which appeared, as you opened it, a fine portion of wool or fur. The ears were pendulous; there was a groove or furrow in an oblique direction down the nose, from the inner angle of the eye. But what is more remarkable than all is, that he had a double scrotum, and the testes, instead of being enclosed in one skinny purse, were contained in two distinct pouches. These, except the latter, are marks belonging to the adiman, or sheep of Africa and India, which Buffon describes as being " a large race, with coarse hair, short horns, hanging ears, and a sort of dewlap and pendants under the neck." (Dr. Mitchell, in the *Medical and Philosophical Register of New York*, vol. i. p. 245.) The late R. R. Livingston, to whom Dr. Mitchell addressed the foregoing description, thought the animal was certainly " the adiman, or ram of Angola, described by Valmont Bomare." The newspaper account stated that around his eyes, for about half an inch in breadth, the hair was black, and about the half of his ears towards the ends was also black; and further, that " there is an annual present of these rams made to the bashaw of Tripoli, by Fezzan; no females are ever permitted to be sent away, and from the length of the journey across the desert, but few males of thôse that are sent, survive the journey; no yolk [unctuous matter which exudes through the skin, and renders the wool soft] was secreted from the body." I regret to add, that in the year 1813, I was informed in New York, that this singular animal had then recently died. I believe it was never figured before. His fleece is exactly like that of the Thibet goat. — *J. M. Philadelphia, Sept.* 7. 1829.

NORTH AMERICA.

Great Harpy Eagle. — One was sent, in Sept., 1828, from Mobile, in Florida, to the Zoological Society of London. It was sixteen months old, and measured from the top of the head to the feet 2 ft. 6 in., and from the tip of each wing 8 ft. 6 in. It was brought from the river Magdalena, in South America. Its plumage was iron-grey, mixed with white. It would eat nothing but meat warm from recent slaughter. It answered to the name of Jack. — *J. M. Philadelphia, Oct.* 10. 1829.

Wild Ducks. (*White's* Selborne, p. 16.) — Among my notes of a visit to the United States of America, in 1805–6, I find the following: — " *Feb.* 1. 1806. On my way up the Chesapeake Bay, in a sailing packet from Norfolk to Baltimore, I was surprised, one morning, to see from the deck the water covered at a little distance with what soon appeared to be living creatures, and which the people on board told me were wild ducks. As the vessel advanced, they opened a passage, as it were for her to pass through; receding, however, but a very few yards from her sides. The surface of the water, as far as I could see from the deck of the packet, was as thickly studded as possible with these birds, covering at least many hundred acres of superficies. I was perfectly astonished by what appeared to be so marvellous a sight, and of which I scarcely could have heard or read, and have believed to be a truth. Those accustomed to eat this bird are very fond of it, but to others, as was my case, its strong fishy flavour is objectionable. They were sold in the market at Norfolk at six or eight for the dollar. As we sailed through this prodigious mass of vitality, the birds manifested no sign of alarm, and I do not recollect that any of them took to the wing." — *William Sells, M.R.C.S. Jan.* 1. 1832.

Mode of decoying Wild Pigeons in New England. — The flight and stool pigeons as they are called, are prepared by passing a thread through the edges of both their eyelids, which are thus closed; their legs are booted, and the flights, being fastened to long strings, are thrown into the air, and fly as far as they are permitted; while the stool pigeon is tied to a narrow board, which, at the end where the bird is fixed, rises and falls; and both kinds of decoy, by the flapping of their wings, draw the attention of the passing flocks of wild pigeons, which are thus made to alight on prepared ground within reach of the concealed spring-net, or on a long pole rising a little from the horizontal line, so as to give the greatest effect to the discharge of the gun from the bush-house which conceals the sportsman. The net, concealed by cut grass, is sprung by a rope, which is pulled at the moment after the pigeons alight upon the prepared ground. (*Silliman's Journal.*)

E'sox ósseus, the Great Gar Fish. — This singular fish is sometimes found in the western waters of the United States, of a great size. Five years since, one was killed, near the town of Jackson, in the Chicasaw country, the length of which was 6 ft., girth 3 ft., and weight 150 lbs. They rise to the surface, and spout water to the height of 10 ft. Their blowing can be heard to the distance of 200 ft. — *J. M. Philadelphia, Oct.* 10. 1829.

Food of Bees in North America. — The American black willow and the red maple are the first trees that are visited by bees. They are fond of the crocus, which is the earliest of our bulbous roots. The stercory and piggery are next resorted to by these insects, and the extract absorbed from them must be used as a tonic. Blossoms of all kinds, except those of the red clover and of the honeysuckle, are excellent food; and the bees especially profit by the increased attention bestowed at present on the cultivation of the peach tree in some parts of America. They not only drink the nectar, and collect the pollen of the flower, but they appropriate the peach itself. We have seen twenty or thirty bees devour a peach in half an hour; that is, they carried away the juices of it to their cells. The scent of bees is so acute that every flower which has a powerful odour can be discovered by them at a great distance. Strawberry blossoms, mignonette, wild and garden thyme, herbs of all kinds, apple, plum, cherry, and, above all, raspberry blossoms, and white clover, are delicious food for them; and a thriving orchard and apiary fitly go together. (*North American Review.*)

A Botanic Garden at Baltimore, attached to the College of St. Mary, has just been commenced; and I am very anxious to procure from Europe plants, seeds, or roots. A correspondence with the principal botanic gardens and nurseries of Britain and France is much desired.—*H. T. Dickehut, Curator of the Botanic Garden, St. Mary's College, Baltimore. August* 10. 1831.

Nelúmbium *speciòsum.* — Is this plant an inhabitant of the continent of America? According to the writings of botanists, it is confined to Asia, but, according to the following account, may also inhabit America. " Among the flowering aquatic plants, there is one, that for magnificence and beauty stands unrivalled and alone. We have seen it on the middle and southern waters; but of the greatest size and splendour on the bayous and lakes of the Arkansas. It has different popular names. The upper Indians call it *panocco.* We have seen it designated by botanists by the name *Nymphæ`a Nelúmbo.* It rises from a root resembling the large stump of a cabbage, and from depths in the water of 2 or 3 to 10 ft. It has an elliptical, smooth, and verdant leaf, some of the largest being of the size of a parasol. These muddy bayous and stagnant waters are often so covered with these leaves, that the sandpiper walks abroad on the surface of the leaves without dipping her feet in the water. The flowers are enlarged copies of the *Nymphæ`a* odoràta, or New England pond-lily. They have a cup of the same elegant conformation, and all the brilliant white and yellow of that flower. They want the ambrosial fragrance of the pond-lily, and resemble, in this respect, as they do in their size, the flowers of the laurel magnolia. On the whole, they are the largest and most beautiful flowers that we have seen. They have their home in dead lakes, in the centre of cypress swamps. Musquitoes swarm above; obscene fowls wheel their flight over them; alligators swim above their roots; and moccasin snakes bask on their leaves. In such lonely and repulsive situations, under such circumstances, and for such spectators, is arrayed the most gaudy and brilliant display of flowers in the creation. In the capsule are embedded from four to six acorn-shaped seeds, which the Indians roast and eat when green; or they are dried and eaten as nuts, or are pulverised into meal and form a kind of bread. (*Flint's Geog. and History of the Western States,* vol. i. p. 89, 90.)

Gold in the United States. — Several years since (1803), gold was ploughed up in Cabarrus County, North Carolina, in the bottom of a small stream which falls into Rocky River, a principal branch of the Pedee. The masses were of different sizes, from small grains to that of a mass weighing a quarter of a hundred avoirdupois. This large piece, when melted and refined, lost only 15 per cent of its weight. Up to the year 1807, the value of gold from North Carolina, brought to the United States' mint in Philadelphia, amounted to 14,310 dollars.* Since that, the precious metal has been found in several counties of the state. Sometimes it is ploughed up, but oftener embedded in rocks, from which it is obtained by blowing them up. Hunting of gold is at length become a serious business, and works are erected to refine it.

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* Mease's Geological Account of the United States, p. 415.

In Virginia, also, several parcels have been discovered; as appears by the following paragraphs in the American newspapers. — *J. M. Philadelphia, Sept.* 20. 1829.

A lump of gold, intermixed with a considerable portion of quartz and particles of earth, and weighing altogether about 6 oz., was ploughed up a few days since, on the farm of Mr. Haley, of this county. It was brought to town, and sold for 85 dollars. (*Fredericksburg, Virginia, Aug.* 29. 1828.)

At one mine (Thompson's) six hands gathered in one week about 480 dollars' worth. At another, two hands, in one day, with a common washing-tub, collected 27 dollars' worth. Our informant understood that a rich mine had been discovered in Orange, and another in Stafford. One of the pieces of gold found in Thompson's mine weighed, it is said, upwards of a pound. (*Petersburg Old Dominion.*)

Gold has been discovered in four or five different places in Habersham County, and it is stated that there are indications of its being as abundant in that region as in North Carolina. Recent discoveries give reason to believe that the gold region of Virginia is more extensive than at first supposed. The region which seems to promise gold lies about fifteen miles above the head of tidewater, extends to an unknown distance westward, and ranges N. N. E. and S. S. W., or nearly parallel with the sea-coast. It contains, for minerals, principally gneiss, cellated quartz, micaceous schistus (upon the gneiss) containing gold, martial pyrites, the quartz and pebble also contain gold mechanically mixed, iron ore abundant, tellurium, glance, specular iron, barytes, and manganese in very abundant strata. In Orange (Virginia) most of the above are found, also a small quantity of copper. (*Boston Patriot*, Aug. 20. 1829.)

In April last we visited the gold region; and we have ever since been confident that, sooner or later, the precious metal would be found in this country. The similarity of our soil, the abundance of flint rock and soapstone, intermixed as it is with copper and iron pyrites, together with other indications, induced the opinion that there was gold in Wake. A few days since, a gentleman who is concerned in a mine in Davidson County, discovered gold in a piece of quartz, on the plantation of Mrs. Catharine Rhodes, a few miles west of this city. A very handsome specimen is said also to have been found in the same neighbourhood, on the land of Mr. John Rex. These discoveries will doubtless lead to more particular examinations, which, we feel certain, will develope deposits of considerable extent. (*Raleigh Register.*)

Climate and Meteorology of the Neighbourhood of the Alle-

ghany Mountains. — I am happy to be able to report that the climate has agreed perfectly well with my whole family, and we have run now nearly the entire circle of the seasons: not the slightest illness, not even a cold, has occurred, if I remember rightly, to any one of us since our arrival. Our position here, near the base of the western slope of the Alleghany Mountain range, is one of the healthiest in the United States. The past season has been delightful in temperature, the thermometer averaging probably about 70° in the day; and the nights have been cool and refreshing. We possess here an advantage somewhat remarkable, but which we prize highly. At about 9 or 10 o'clock every morning a refreshing breeze springs up, and continues until 3 or 4 o'clock in the afternoon; and it is this, perhaps, which makes our situation so healthy, and enables us, without inconvenience, to bear the warmest days of summer. These delightful breezes appear to proceed from the north or north-west, and remind us of the sea breezes upon the never to be forgotten shores of dear Old England.

I am situated about 1350 ft. above the sea, and about 800 to 1000 ft. below the main ridge of the Alleghany Mountains. There is one depression, or gap, as it is called, ten miles hence, which I have found, by levelling, to be only 600 ft. above us, and which 600 ft. is distributed pretty gradually along the base of ten miles. Consequently, you will observe that it is possible to descend the Alleghanies westward at a very small angle; not much more, indeed, than half a degree, which is not a very alarming inclination for a railroad. The eastern descent is more rapid, perhaps 3° for the first three miles, following the natural fall of the watercourses. I cannot but consider that our climate is materially influenced by our proximity to this vast mountain ridge, which is 1200 miles in length. I find very little variation in the barometer from 29 in. A fall always precedes wind from the N. W. We never suffer much from the extreme heat of summer, nor are we materially colder in winter than is observed in the cities on the Atlantic coast. One of my friends here kept an accurate meteorological journal during many years; and I brought out with me two of Jones's best mountain barometers, which I amuse myself by frequently referring to. Our prevailing winds are from the north-west, which winds certainly bring a vast quantity of rain. The present summer has been more wet than has occurred in the memory of man. Rain has fallen, on an average, every alternate day; yet the evaporation is so great that no great inconvenience has arisen, except of late, when dry weather is needed for the hay and corn harvests, which occur at the same time. The farmers in the corn district are beginning to complain of the damage done to their crops by the continued rains, and serious injury has been sustained from floods. This unusual moist state of the atmosphere has kept the air and the surface of the earth unusually cool. We have not had but one week of really hot weather, and then not more than I have felt in England for much longer periods, particularly for nearly three months in 1826.

My stock of illustrative works on natural history, in other branches besides geology, is very limited, and there are no libraries in the Pennsylvania forests. But we have living specimens to study in abundance. Of the birds I have collected and stuffed only a few, at present. Of insects I have preserved a considerable number, considering the unfavourable season. The butterflies are beautiful, and, as I have not attended to them heretofore, they have all the charms of novelty. My children, too, are all collectors in their way; and I encourage those habits in them. The flowering trees, shrubs, and plants come out in almost endless succession. I make one remark on these, *en passant*, that the prevailing colour of American flowers is white, at least, nine out of ten I think; particularly in those which make the greatest display in this region, such as the dogwood, kalmias, rhododendrons, service, the thorn tribe, bird cherry, mountain cherry, or cherry birch, and a host of others. Every week brings forth some new beauty. The *O'rchis* tribe is here very showy: our meadows are now gaudy with tiger lilies and Œnothèræ, &c. In April and May arrive a vast variety of birds from the south. The most numerous are the orioles: the males are distinguished by their gaudy scarlet and yellow wings; while the females, which appear in the proportion of twenty to one male, are wholly black. We have a great number of woodpeckers, some kingfishers, various waterfowl, cat birds, king birds, robins, whip-poor-will, loons, crossbills, jays, kites, bluebirds, yellowbirds, blackbirds, and others with equally unscientific names. The cardinal bird and the bald eagle are among the rarest.

The first humming-birds appeared June 6.; since which time they are commonly to be seen fluttering about the flowers in my garden. Frogs commenced their concert, March 26.; whistling, rather than croaking, with a prodigious noise at night. Bullfrogs began to croak, June 1. The first bats seen, May 15. The first butterfly caught, May 16. May-flies, April 20.; a small species, Feb. 26. Garter snakes appeared, April 25. Flocks of wood-pigeons began to pass to the N.W., March 7. Wild swans appeared, March 27. First mosquito, Feb. 28. Orioles came in flights, March 7. First swallow, and first toad, April 13. Many snipes arrived, April 1. The hepatica, the trailing arbutus, and the white, the yellow, and the blue violets, first observed in blossom, April 22. Indications of the existence of beavers in an adjoining stream, in the fresh cut stakes, barked by those animals, and floating down the stream. Traces of the musk rat in the Moshannon creek, at the foot of my garden. Very large spiders and centipedes come out of their hiding-places May 1., as do the beetles. Caught twenty-four trout with the artificial fly, May 3. Many land lizards in the woods, May 21. Two rattlesnakes killed May 28.; several other species of snake previously seen: a rattlesnake, 3 ft. 7½ in. long, and 6 in. round, killed here, June 3. Fire flies appeared, May 28. A land tortoise in my garden. Snapping turtles and terapins caught in July. The tulip trees in flower, June 8.: these trees are 140 ft. high. Took a young spotted fawn in the woods (Cérvus virginiànus) July 20., now so tame as to run at large, and follow the children. — *R. C. Taylor. Philipsburg, Pennsylvania, Aug.* 7. 1831.

The Esquimaux Lake. — This lake is said to extend from north to south more than 150 miles, and about the same from east to west. It is reported to be full of islands, to be every where brackish, and to receive two large rivers besides the eastern branch of the Mackenzie. It may be plausibly conjectured that the alluvial materials brought down by the Mackenzie and other rivers have gradually formed a barrier of islands and shoals, which, by preventing the free access of the tide, enables the fresh water to maintain the predominance behind it. The action of the waves of the sea has a tendency to increase the height of the barrier, while the currents of the rivers and the ebb tide preserve the depth of the lake. A great formation of wood coal will, no doubt, be ultimately formed by the immense quantities of drift timber deposited on the borders of this lake. —*J. R. Lee, Kent.*

SOUTH AMERICA.

Second Species of South American Tapir, making the third Species of the Genus. — M. Roulin, in the form of a memoir professing to furnish an abstract of the history of the tapir generally, and a description of a new species appertaining to the high regions of the Cordilleras of the Andes, some time ago presented to the scientific public a most interesting and amusing dissertation; in which he not only identifies the newly discovered quadruped with the subject of a legendary history, hitherto believed to relate to a merely fabulous animal, but appends to it a very ingenious speculation upon the mé of the Chinese and the griffin of the ancients; the origin of both which supposed imaginary monsters, the learned author endeavours to trace to exaggerated portraitures of the beast which forms the subject of his essay.

M. Roulin prefaces the account of his discovery with a few observations upon the first published descriptions of the common South American tapir. Although the tapir was imperfectly known in Europe at the commencement of the 16th century, Marcgrave was the first writer who gave a complete and concise history of the animal, erring only in attributing to it ten (instead of six) incisive teeth in each jaw: and Buffon, even after he had received a specimen from Cayenne, which was dissected in the Jardin du Roi, relying too much upon the faith of the Saxon naturalist, allowed the error to remain. The credit of discovering the Indian or Malay species is claimed by M. Roulin for MM. Diard and Duvaucel: but the animal was noticed, according to Mr. Griffith, as early as 1772; and it appears that the first detailed account of a living specimen at Barrackpore was given by the lamented Sir Stamford Raffles. [See this question discussed in detail in Mr. Swainson's Defence of certain French Naturalists, in our Vol. IV. p. 101.; and in the replies to that article, Vol. IV. p. 200. 205. and 316.]

During several months' journey along the course of the Andes, the attention of M. Roulin appears to have been drawn towards the probability of discovering a peculiar species of tapir in the lofty regions of the mountains, by the vague yet universal reports of the native Indians and Spanish settlers, who appear to confound under the title of *pinchaque* (phantom or spectre), at least two animals either real or imaginary; one of which M. Roulin believes to be his new species of tapir; and the other, it is surmised by Cuvier, may possibly prove to be the Mástodon, if that gigantic link between the fossil and the recent world be indeed still in existence. The Indians of many villages near Popayan speak of an enormous animal, which dwells in the mountains by which their valley is bordered to the east. This animal is to them an object of fear, and at the same time of respect; for, prior to the introduction of Christianity among their tribes, they believed in a kind of metempsychosis [transmigration of souls from one body to another], thinking that the souls of their ancient chiefs had passed into the bodies of the pinchaques; and when one of these creatures appeared, they considered that it came to avert some approaching calamity, with which their descendents were menaced. This apparition takes place only at nightfall or daybreak, on the edges of the forest, which the spectral quadruped enters with a great noise. It does not show itself in all places; but commonly on the Paramo de Polindara, a high mountain, two leagues from the volcano of Purace, and eight from Popayan.

Upon this subject, the reports of the Indians are consistent in all respects, except the size of the animal; for, whilst the most moderate affirm that the pinchaque only equals the horse in magnitude, others maintain that its height is excessive. Some of the inhabitant of Popayan are persuaded that there really exists in this mountain a very large quadruped; and one learned man pronounced it to be a carnivorous elephant, by which name is designated the Mástodon with narrow teeth, the osseous remains of which are found in many places in New Granada. The hunters, guided by the Indians, have long sought in vain for this mysterious quadruped; but, although they have hitherto been baffled in their endeavours to obtain a sight of it, they obtained the most unequivocal proofs of its existence, by discovering footsteps in the loose earth 9 or 10 in. wide, and balls of dung of a very large size. M. Roulin, however, upon examining one of the latter, upon the Paramo near Bagota, pronounced it to be that of the tapir, from its containing the undigested remains of the usual food of that animal. One hunter met with a still more apparently conclusive evidence, not only of the presence of the pinchaque on the Paramo de Polindara, but of its gigantic height; having observed a tuft of long brownish hair upon a branch from 8 to 10 ft. above the ground, which it is supposed to have rubbed off in passing under the tree. It is still far from impossible that this may have also belonged to a tapir, or perhaps to a bear (*U̓rsus* ornàtus *F. Cuvier*).

It was, however, in the province of Mariquita that our author was led more especially to seek for the living representative of the half-fabulous pinchaque; and he pursued his enquiries with the greater hope of success, as many of the ancient Spanish chroniclers, particularly Oviedo and P. de Agueda, have mentioned the existence of a tapir of a brownish black colour, and furnished with thick hair, which has been considered as an erroneous description. The accounts of these old writers was, however, confirmed by the modern natives, particularly the Cargueros, who inhabit the valley of Cauca, &c., at the foot of the Paramo de Quindiu: these people informing the traveller that a large species of tapir, answering to the description of Oviedo, inhabited the forests which skirt the eastern declivities of the Cordilleras in the province of

Mariquita, 500 or 600 mètres above the plains; the ordinary species being found only upon the latter, and in the valleys.

At length the unceasing researches of the zealous naturalist were crowned with success. It is customary throughout New Granada, at the octave of the *Fête Dieu*, to decorate the principal churches with a kind of grove, in which are placed living or dead birds and quadrupeds, remarkable either for the brilliancy of their colours, their magnitude, or their monstrosity: and during this festival, at the village of Bagota, M. Roulin had the gratification of seeing two specimens of the long-sought animal, which had been killed on the Paramo de Suma Paz, a mountain more elevated than that of Quindiu; and he afterwards was fortunate enough to obtain a head, which, being conveyed to Paris, has been subjected to the inspection of Baron Cuvier. The examination of this great zootomist has revealed a very anomalous and unexpected fact, namely, that the cranium of the new species approaches much more nearly in characters to that of the Indian, than of the previously known American, tapir, and still more closely to that of the Palæothèrium, an extinct genus, the remains of which are found in the tertiary beds of the Paris basin. Attached to his memoir, M. Roulin has presented figures of the crania, and thus enumerates their similitudes and differences: — The principal resemblances between the skulls of the new species and of the Sumatran tapir consist in the general shape of the forehead, the defect of the projection of the parietal crest, the dimension of the nasal bones; and, finally, the form of the lower jaw, the inferior margin of which is straight (in the Cayenne or South American species it is strongly curved). The differences between the cranium of this animal and of the Palæothèrium are principally remarked in the forehead and nasal bones, which are more depressed in the former; and in the lower jaw, the posterior angle of which is more obtuse: the teeth are smaller, and the grinders do not so closely approach the canines.

The principal external peculiarity which distinguishes the new tapir from both its congeners is one that is strictly accordant with its locality in the temperate, or rather cold, altitudes of the lofty mountain range which it inhabits. The body is entirely covered with long hair of a blackish brown colour, darker at the points than at the roots; whereas the other species, which fully share the high temperature of a tropical climate, are almost bare of fur. Its size is inferior to the others: the largest of the specimens seen at Bagota measuring in length, from the muzzle to the point of the tail, only 5 ft. 6½ in.; and in height, at the shoulders, 2 ft. 9 in.

The head differs from that of the common species of South America, not only in its general outline, but in its details: the muzzle varies a little in its form, and the proboscis does not present upon its sides those ridges which indicate a habitual contraction of that organ. On the chin is situated a white patch, which is prolonged from the angle of the mouth, and includes nearly half the upper lip. The ear is deficient of the white margin; and the remarkable erect crest, which in the ordinary American species commences above the eyes, and is continued, like a hogged mane, along the ridge of the neck to the withers, is also wanting; the neck being perfectly round, and the hair with which it is covered of the same length as, and lying in a direction similar to, that of the rest of the animal. On each side of the crupper is situated a large naked, but not callous, spot, about twice the size of the palm of the hand. Above the division of the toes the fetlock is margined with a narrow white band, as in the common American tapir. On this species its describer has bestowed the name of *Tapir Pinchaque*; thus identifying it with the traditionary histories of the natives of its habitat; and, under that denomination, Cuvier has given it a place in the new edition of the *Règne Animal:* but neither that able systematist, nor its discoverer, has furnished it with a Latin specific appellation. It appears that the tapir of the mountains does not possess all the habits of that of the plains, which is strictly a nocturnal animal, sleeping during the entire day, and feeding only in the night; as those killed at Suma Paz were eating at six o'clock A. M., when approached by the hunters; and, on the road to Quindiu, others have been observed employed in a similar manner, even at nine o'clock. The hunters reported that they principally subsisted upon *chusque* (a species of bamboo, which grows at a great height), and that they also eat *fraylajou* (Espelèt*ia*), a plant which common cattle, horses, mules, asses, and even the deer which inhabit the mountain, refuse to touch, on account of the quantity of resin which it contains. This tapir is extremely greedy, and by no means delicate in its taste; those kept in the menageries will devour almost every thing: and this is not from depravity of appetite, produced by captivity; for, when killed in a wild state, their stomachs are found to contain pieces of wood, clay, small pebbles, and occasionally even bones. By the hunters the two species are confounded under the general appellation of *danta*, which, as it is observed by M. Roulin, is somewhat singular, since persons of their class are usually very accurate in their distinctions between the species and varieties of such animals as they are in the constant habit of pursuing; and in this instance it is particularly remarkable, as the same men enumerate five distinct species of peccary, of which two only have hitherto been recognised by naturalists, but to which our author intends adding a third.

Mé of the Chinese. M. Roulin commences his disquisition upon the mé of the Chinese (*fig.* 92.), which has hitherto been considered as an imaginative chimera invented by that extraordinary people, with the following observation: — It is not alone in the new continent, that the history of the tapir has been mingled with that of fabulous animals. The marvellous mé of the Chinese authors, with the trunk of the elephant, the eyes of the rhinoceros, and the feet of the tiger; which gnaws iron and copper, and eats the largest serpents, is, as has been well judged by M. Abel Rémusat*, nothing more nor less than a tapir; but, says our author in continuation, I do not believe, with that zoologist, that the tapir is an inhabitant of China. A small animal, as a serpent, a lizard, or a mouse, might escape our researches; but it is unlikely that so large a quadruped should exist in China unknown to Europeans. The history of the mé is undoubtedly founded upon an incomplete description, and a rude representation, of the Malacca tapir.

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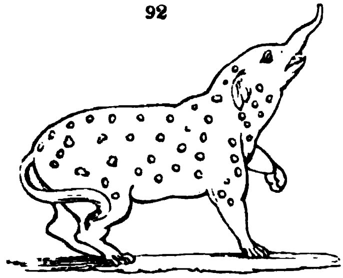

Representations of the mé may frequently be seen engraven upon the utensils of the Chinese; printed in their stuffs, and sculptured upon their amulets, which are usually formed of jade. One may easily conceive, continues M. Roulin, in these rude representations, that the large feet of the tapir, divided into toes, closely imitate the claws of a cat; that the spots (with which all young tapirs are variegated) appear to resemble, and may be easily arranged to imitate, those of a leopard; that the trunk, exaggerated in the original outline, and still more increased in length by copyists, may have been manufactured into that of an elephant; and that the tail (which is extremely short, and almost invisible, in the tapir), being considered as an omission in the first drawing, has been subsequently supplied by borrowing that of the most common quadruped of the same size. The alleged habits of the mé, like its shape, are not very inconsistent with those of the tapir. It is affirmed to gnaw iron, copper, and wood: the American species also swallows wood and clay. D'Azara has seen an individual gnaw a silver snuff-box; and it would, doubtlessly, with equal readiness have taken between its teeth a piece of iron or of copper; and the tapir of India most likely possesses similar propensities. The mé is likewise affirmed to eat serpents: although it has not been recorded that the tapir possesses the same appetite, it is, from its carnivorous and greedy disposition, far from improbable; particularly when we consider that the hog, with which the tapir has so many affinities, in France pursues and devours the viper; and that, under the tropics, those animals attack reptiles which are much more dangerously venomous. Among the absurdities related by the Chinese of their partly fabulous mé, they affirm that its bones resist fire and steel; and amulets are accordingly supposed to be manufactured of them. These are usually constructed of the bones of fishes' heads, those of the ear of some quadruped, or of the lamantin; and it is observable that the priests of Buddha possess the same pretendedly indestructible relics.

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* The idea that the mé was derived from a tapir is by no means original either with M. Rémusat or M. Roulin; for, even by the evidence of a French author, M. Lesson, the credit of the discovery is due to a native of our own country. That author says: — "In the figure of the mé of the Chinese, an Englishman thinks he recognises a tapir, which he has figured in the *Asiatic Journal*, under the name of the *Tapirus* sinénsis." (*Manuel de Mammalogie*, p. 326.)

This portion of his subject the ingenious essayist concludes thus: — Whether the knowledge of the mayba (American tapir) has penetrated to China, or whether that of the Indian species has reached that country through the centrè of Asia, the inhabitants have not disfigured it more by their relations than by their representation; so that the animal can be equally recognised by its form and its alleged habits.

Griffin. In attributing to the griffin of the Greeks a similar origin with the mé of the Chinese, M. Roulin uses the following arguments and illustrations: —

The Greeks, who trafficked across the Black Sea, came in contact with the Scythians, and they, on their part, traded with the Argipeans; a Tartar people, with long chins, flat noses, and shaved heads, who inhabited the valleys at the foot of the Ural Mountains; the rich mines of which, no doubt, formed a constant theme of intelligence from the Scythians to the Greeks. In those early and superstitious ages every treasure was supposed to possess its peculiar guardian; and, from obvious motives of policy, such warders were chosen as would appear not less redoubtable in their power than repulsively frightful in their appearance; and hence arose the compound images of the winged serpent, the dragon, and the griffin, with the beak of an eagle and the claws of a lion. This last figure, our author conceives, was originally the guardian monster of the treasures of the Ural Mountains, the Cordilleras of the Argipeans; and that its representation and its fabulous history were conveyed to the Grecians by the intervention of the Scythians, mingled with the traditions respecting the richness of the gold mines, in a manner conformable with the spirit of the times.

This animal (*fig.* 93. *a*), as it is evident by the illustrations

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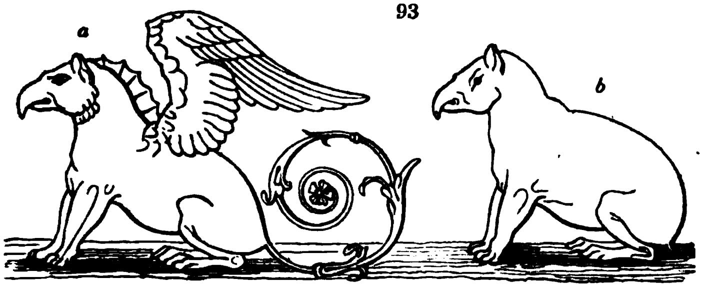

of M. Roulin's memoir, which we have copied, possesses in its general outline a close resemblance to the tapir in a sitting attitude (*b.*); and that learned naturalist thus accounts for its possession of the various addenda of wings, crest, and tail: — It is evident, says he, that the original image of the griffin, when introduced into Greece, was destitute of wings; as Herodotus, the oldest author who describes it, does not mention them, and his very important silence upon that point is a sufficient proof of the fact. But the more ancient dragons of the caverns of Greece, were nearly all furnished with those members; and, therefore, upon the introduction of a new monster, it would naturally appear requisite, according to the preconceived notions of the people, to add them to its figure; and it was no very great stretch of imagination to accord the wings of an eagle to an animal which seemed already to possess its head; for the proboscis of the tapir, when bent down in its usual position, bears no little similitude to the beak of that bird.

The sculptors, who considered the griffin in a picturesque point of view, employing it in their arabesque ornaments, again contributed to alter its original form. To bestow additional gracefulness to its neck, they surmounted it with a mane like that which decked their horses; making the hairs short, straight, and erect; or it is not impossible that they might in reality have retained the genuine mane of the tapir. Afterwards, to render still more fantastic a being which was already intermediate between a quadruped and a bird, they converted this crest into the likeness of the dorsal fin of a fish.

The division of the toes of the tapir caused, with the Greeks, the same error as with the Chinese in the fabrication of their mé; and accordingly they substituted for them those of a lion. As to the tail, it was almost certain that they would attempt to supply that appendage: and, whilst some merely gave to the animal one conformable with its feet; others, desiring to make the figure wholly imaginary, bestowed upon it a spiral scroll, and ornamented it with the leaves of the *Acánthus*. (*Annales des Sciences Naturelles.*)

WEST INDIES.

Insects which infest the Sugar Cane (*Sáccharum officinàrum* L.). — The Rev. Lansdown Guilding, B.A. F.L.S. F.G.S., &c., has been honoured by the Society of Arts with the gold Ceres medal, for his memoir on this subject, of which the following is the essence: —

The *Calándra* palmàrum (*fig.* 94. the female creeping: *fig.* 95. *a*, the male; *b*, the larva; *c*, the pupa; and *d*, the case or follicle: all of the natural size) "is principally injurious to the plants lately stuck in the ground, to which the female is allured by the juices which are exuded. These they sometimes attack so vigorously, that a fresh planting becomes necessary. They do not seem to deposit their eggs in full-grown canes, when palms are abundant in the neighbourhood."

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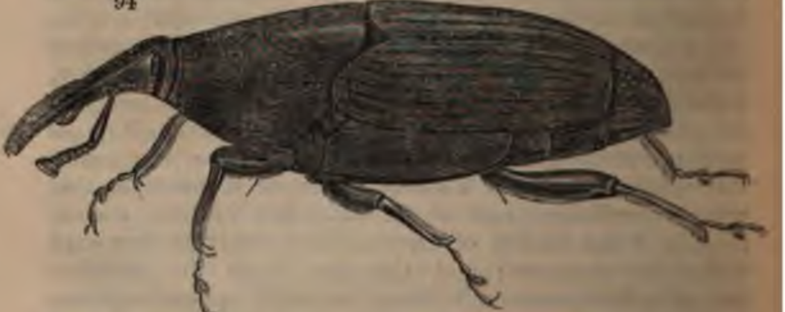

Calándra sácchari (*fig.* 96.) "confines itself principally to such canes as have been slightly injured; though it sometimes attacks the more vigorous plants, which it excavates to the

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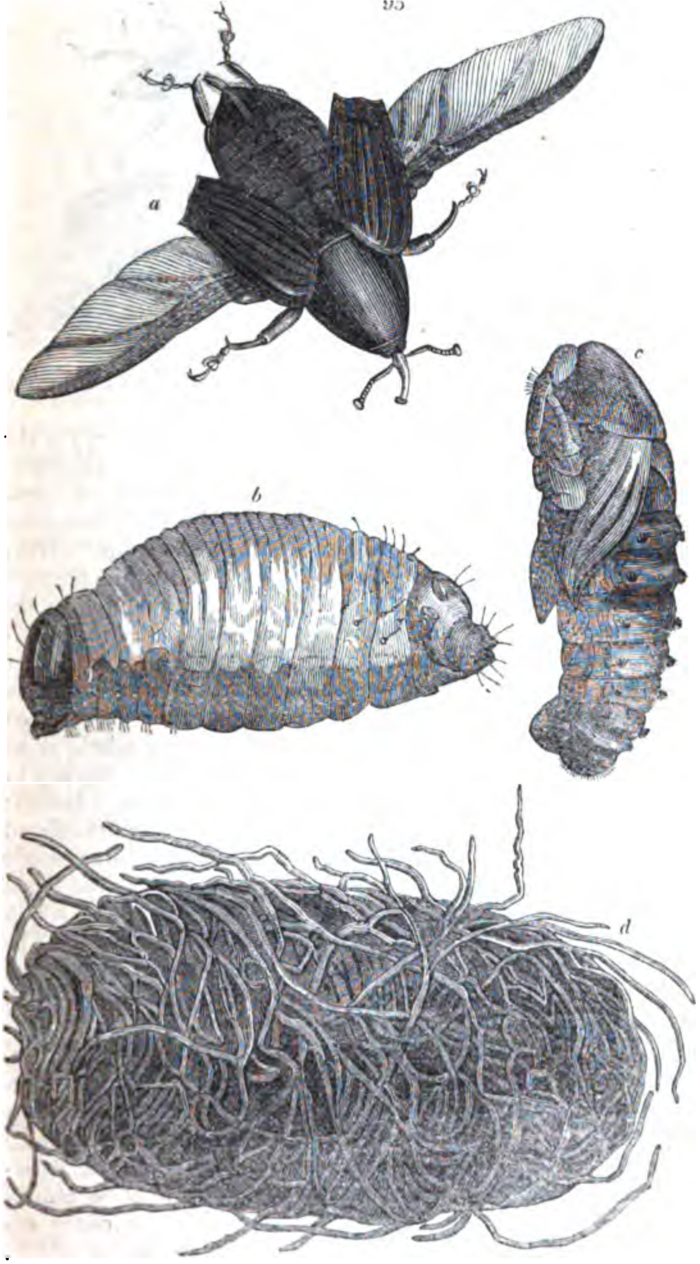

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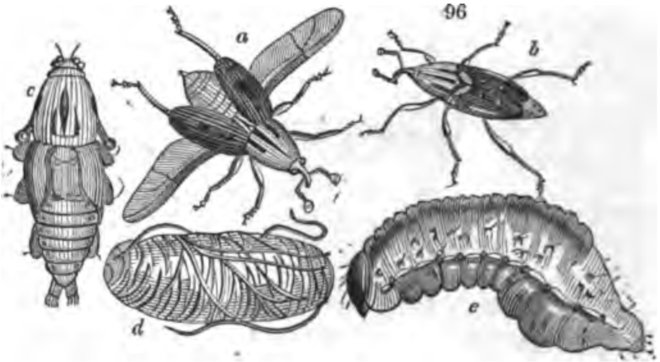

a, *Calándra* sácchari. *b*, a variety. *c*, pupa. *d*, follicle or case. *e*, larva.

very ground, voiding its excrements in scarcely discoloured grains, which fill up the passage.

"But by far the most destructive and common enemy is the smaller grub of the borer moth, Diatræ'a sácchari *Guilding*, (from *diatreo*,) to bore [which belongs to that family of Lepidoptera called by Leach Pyrálidæ, and is elaborately described and illustrated in the memoir from which this account is transcribed.] The sugar-cane, so valuable to man in all its parts, is never exempt from this dreadful pest. Fortunately, in the seasonable climate of St. Vincent, from our improved cultivation, the animal is not very formidable; but in some other of our colonies, which, from the absence of mountains, or other causes, are subject to dry seasons, they have been known to blast the hopes of the year, to destroy whole acres of canes, and ruin the unfortunate planter. The Society of Arts has long offered rewards for the expulsion of the borers; but, I think, will do well in future to omit the premium offered for their destruction, inasmuch as it is to be feared no remedy can be applied on extensive tracts of land, which would not at the same time destroy the plant we would protect, or which would not prove too extensive for general adoption. The object of the planter should be, to prevent the insects from depositing eggs in the plants, rather than to kill those which have already begun their operations.

"Those animals which the Creator has thought fit to form, and preserve for ages, man will not be permitted to exterminate; we may, however, with propriety, strive, by all means in our power, to lessen the numbers of those creatures which injure or destroy our property. From long-continued experiments, I have at last discovered that they may be almost entirely expelled from any quarter in which the canes are carefully stripped of the dry and useless leaves, under which, as they become loose, the female borer deposits her eggs.

"These animals, when they assail us in moderate numbers, act only as a stimulus, wisely sent to rouse the inattentive planter to cleaner and more careful modes of husbandry. When they swarm so as to deprive him of his crops, the loss must in future be attributed either to his obstinacy or his negligence.

"It is well known that the sheathing leaves of the cane hold for a long period the water which has been collected in them during rains; from which, in dry weather, the plant may doubtless derive nourishment. In the drier islands, the planter will probably object to the only plan which seems capable of lessening the number of his foes, under the idea that he will expose the plants too much to the merciless rays of the sun. I do not by any means recommend that a single living leaf should be taken off; and a very slight examination will convince him that those which have begun to wither are incapable of holding water for the refreshment of the cane.

"The borers are observed to be much more fatal to plant than to ratoon canes, which should, of course, be oftener visited by the parties of negroes whose business it is to collect the trash. A single cane will sometimes nourish several of the borer worms, which perforate every joint; when the pithy centre, becoming discoloured and sour, not only yields nothing at the mill, but communicates a dark colour and bad quality to the sirop of the sounder plants.

"Of the other enemies of the sugar-cane, I can for the present speak but slightly. The large fire-fly (E'later noctilùcus) has been said, but perhaps only accidentally, to have been bred in it. An undetermined aphis, and the 'jumper fly,' probably one of the Chrysomélidæ, have in some islands proved injurious, but have never been noticed here. The myriads of ants which once infested, but have now disappeared from, Grenada, committed, indeed, the most frightful ravages; but it was rather by excavating their little metropolis beneath the roots, than by attacking the body of the cane. Were these little carnivorous agents less prolific than they are, we might encourage them as useful helpmates in the destruction of the borers, which they pursue and kill in their cylindrical labyrinths." (*Trans. Soc. Arts*, vol. xlvi. p. 153.)

Kirby and Spence, in enumerating the "benefits derived from insects," in their *Introduction to Entomology*, vol. i. p. 298., thus remark: — "Many larvæ that belong to the order Coleóptera are eaten in different parts of the world. The grub of the palm weevil (*Calándra* palmàrum) [*fig.* 95. *b*], which is the size of the thumb, has been long in request in both Indies. Ælian speaks [*Hist.*, l. xiv. c. 13.] of an Indian king, who, for a dessert, instead of fruit, set before his Grecian guests a roasted worm taken from a plant, probably the larva of this insect, which he says the Indians esteem very delicious: a character that was confirmed by some of the Greeks who tasted it. Madam Merian, in her *Insects of Surinam*, has figured one of these larvæ, and says that the natives of Surinam roast and eat them as something very exquisite. A friend of mine, who has resided a good deal in the West Indies, where the palm grub is called grugru, informs me that the late Sir John La Forey, who was somewhat of an epicure, was extremely fond of it when properly cooked."

In Kirby and Spence's tables of the comparative magnitudes of insects (in their vol. iii. p. 33. to 37.), mention is made of a new species of *Calándra*, preserved in MacLeay's museum, which is 3⅝ in. in length and 1 in. in breadth. — *J. D.*

Facts and Observations in Natural History. — Sir, A gentleman having put into my hands a quarto copy of White's *Natural History of Selborne*, with a request that I would, in the course of my reading it, write on the margin of its leaves any facts or observations which might have come in my way relative to similar subjects, most of the following notes were written accordingly. Those which relate to White's remarks have the particular page of White's book in which they were first written affixed to them. I am, Sir, yours, &c. — *William Sells, Surgeon, M.R.C.S. Kingston, Surrey, January* 1. 1832.

[The principal part of these notes relate to animals of Jamaica. A note on wild ducks will be found under North America, p. 452, and the remainder under Collectanea, in our next Number. — *J. D.*]

Bats. (*White's* Selborne, p. 93.) Bats of the ordinary size are very numerous in Jamaica; they are found in mills and old houses, especially such as are little occupied: they do great mischief in gardens, where they eat the green peas, opening the pod over each pea, and removing it very dexterously.

[The above mention of bats feeding on vegetables induces here the introduction of two extracts, which seem to contest that point, at least as far as the vampire bat of India and that of South America are concerned. Bishop Heber says: — "The vampire bat of India is a very harmless creature, of habits entirely different from the formidable idea entertained of it in England. It only eats fruit and vegetables, and indeed its teeth are not indicative of carnivorous habits; and from blood it turns away when offered to it. During the daytime it is, of course, inert; but at night it is lively, affectionate, and playful, knows its keeper, but has no objection to the approach and touch of others." (*Bishop Heber.*) These remarks, how-
n the vampire of India do not correspond with Waterton's

observations on the vampire of South America, as expressed in the *Wanderings*. According to the accounts there given, " the vampire (*Vespertílio spéctrum*) is a species of bat, which sucks the blood of man and every unprotected animal. There are two species in Demerara, both of which suck living animals: one is rather larger than the common bat; the other measures above two feet from wing to wing extended. " So gently does this nocturnal surgeon draw the blood, that, instead of being roused, the patient is lulled into a still profounder sleep." The larger vampire sucks men and other animals; the smaller seems to confine itself chiefly to birds. " I learned from a gentleman, high up in the river Demerara, that he was completely unsuccessful with his fowls, on account of the small vampire. He shewed me some that had been sucked the night before, and they were scarcely able to walk." (*Waterton.*) Whether the vampire of India and that of South America be of one species, perhaps some systematist will please to advise us. — *J. D.*]

Cats, their general Dislike to Water. (*White's* Selborne, p. 82.) An instance of one which swam over two rivers to return to her former abode. — In 1807, when living at Four Paths, Clarendon, Jamaica, I wanted a cat, and had one given to me, which was nearly full grown: it was brought from Morgan's Valley Estate, where it was bred, and had never been removed from that place before The distance was five miles. It was put into a canvass bag, and carried by a man on horseback. Between the two places there are two rivers, one of them, named the Mino, is about 80 ft. wide, and 2½ ft. deep, running strong: the other is called Thomas's River, which is wider and more rapid, but less deep: on these rivers there are no bridges. The cat was shut up at Four Paths for some days, and when considered to be reconciled to her new dwelling, she was allowed to go about the house. The day after obtaining her liberty, she was missing; and, upon my next visiting the estate she was brought from, I was quite amazed to learn that the cat had come back again. Query, Did the cat swim over the rivers at the fords where the horse came through with her, or did she ascend the banks for a considerable distance, in search of a more shallow place, and where the stream was less powerful? [Instances are recorded, Vol. IV. p. 430., of the domestic cat's spontaneously and habitually diving for fishes and rats. — *J. D.*]

Caprice of Appetite in Goats. Among my notes, in the journal of my voyage to England from Jamaica, in 1823, is the following: — " We have a grey goat on board, with as strange a depravity of appetite as was shown by my old fellow voyager on board the Westbrook, in 1821. It eats greedily the rush bottoms of the chairs, and the Spanish mats. One day I had my trunk on deck, in order to look over my clothes, when she and her kid speedily stripped off some of the leather covering, and eat it. In case a birch broom was left where the goats could get at it, they quickly demolished it. The goat on board the Westbrook had an especial predilection for feathers; for, as sure as any unfortunate capon allowed his fine tail to appear between the bars of the coop, the goat seized upon, pulled out, and eat it, causing the poor bird to cry piteously while under this rude operation: this would happen particularly when the fowls were roosting with their heads to the back of the coop; and so persevering was the goat in this favourite pursuit, that, after a while, we had not a capon on board but had been deprived of its long tail feathers. Were I to account for this seeming depravity of appetite in goats, it would be in the following manner: — All ruminating animals like a supply of dry hard fibrous food, upon which to exercise the process of chewing the chud; and, in the absence of it, the animal may experience uneasiness, from the want of the stimulus of distention, as well as a proper employment of the gastric and salivary juices, and consequently a suitable supply of food which has undergone rumination. In this way may be explained the fact of goats refusing to eat the maize (Indian corn) which was given to them, and their eating, in preference, such strange substances as wooden hoops, canvass, reeds, feathers, brooms, &c.

Turkeys eat Caterpillars which feed on Tobacco; and Hogs eat the poisonous Root of Cassava (Janìpha Mánihot). I once found the larva or caterpillar of a large *Sphínx* (the size of that of the privet sphinx) feeding on a tobacco plant in Jamaica. An American gentleman, who saw it also, immediately observed that the tobacco plantations in Virginia were occasionally much infested by caterpillars; in which case, the planter turned in flocks of turkeys, which soon cleared the plants of their destroyers; and the turkeys, in place of being injured by such food, actually throve upon it. This brings to my recollection the fact, that hogs, in Jamaica, eat with perfect impunity the root of the *Janìpha Mánihot*, or bitter cassava, which is a most deadly poison to man, unless the water be completely expressed before cooking. [See, in *Gard. Mag.*, vol. vii. p. 470., numerous interesting particulars respecting it.] I once knew a fine youth die in a few hours, from eating of the cassava from which the water had been imperfectly squeezed. [The common large snail of the gardens (*Hèlix* aspérsa *Müller*, *H.* horténsis of *Pennant*, not of *Müller*) freely feeds on the fiery-flavoured foliage of Clématis Flámmula *L.* — *J. D.*]

Fondness of Poultry for Pepper. The Cápsicum frutéscens, which, and which alone, affords, when dried and powdered, the genuine Cayenne pepper, is commonly known in Jamaica by the name of bird-pepper, or hen-pepper, on account of its being so much eaten by birds, and especially by hens and turkeys, which will not leave a pod remaining on the bush that is within their reach by jumping up to them. They are so fond of these pods, as to eat a great number of them at a time. These peppers are called chilies in England. Even the Cayenne sold in Jamaica is prepared from several sorts of red capsicums, mixed with the C. frutéscens; but they are all much inferior in pungency and fine aromatic flavour; and persons who would have it genuine are obliged to prepare it in their own families.

Teal. (*White's* Selborne, p. 17.) During the months of November, December, January, and February, the climate of Jamaica is rendered delightfully cool, by the blowing of the north-west wind, which passes over the continent of North America, and, except an occasional light shower, the sky is always bright, with constant sunshine: so that at an elevation of about 1800 feet above the sea, where my residence was for many years, the temperature was delightful, the thermometer, in the morning, ranging from 56° to 60°, and, at noon from 70° to 75°. Through the above-named period the island is visited by vast flocks of teal, of the species, I apprehend, named by Gmelin the carolinénsis or American teal. They make their way to ponds, and up the courses of rivers; and are shot in great numbers. I once saw a gentleman knock down several with grains of Indian corn, used at the moment as a substitute for shot, of which he had exhausted his little supply. This bird is most delicious eating, and so superior in flavour to all others of its class, as to be worth preserving and sending to England in the same way that we put up the game of this country for ship use in long voyages. It is considered to come from the Southern States of North America. I have been assured that some few remain in Jamaica all the year round, breeding in the swamps and lagoons near the sea.

Humming-birds. (*White's* Selborne, p. 189.) White, in his *Natural History of Selborne*, says: — "In the season of nidification the wildest birds are comparatively tame." This observation applies to the humming-bird. I remember a pair of these beautiful little creatures busily building a nest in the branch of an orange tree, which was close to the outer side of the open piazza of a house in Spanish Town, Jamaica:

in this apartment, situated on the north side of the house, the family breakfasted and lunched. I spent three days there; and, while taking my meals, had at least an equal treat, in seeing these smallest of the feathered tribes gaily and actively employed in their building process. I have now in my possession a nest of the bee humming-bird, which I removed from the end of a branch of a mango tree [Mangífera índica] which was not a foot above my head, and close to the door of a dwelling-house. I cannot quit this article without speaking of the delight that was afforded me, in Jamaica, by seeing humming-birds feeding on honey in the florets of the great aloe [Agàve americàna *L.*]. On the side of a hill upon Sutton's Estate (the property of Henry Dawkins, Esq.) were a considerable number of aloe plants, of which about a dozen were in full blossom. They were spread over a space of about twenty yards square. The spikes, bearing bunches of flowers in a thyrsus, were from 12 to 15 ft. high; on each spike were many hundred flowers of a bright yellow colour, each floret of a tubular shape, and containing a good-sized drop of honey. Such an assemblage of floral splendour was in itself most magnificent and striking; but it may be imagined how much the interest caused by this beautiful exhibition was increased by vast numbers of humming-birds, of various species, fluttering at the opening of the flowers, and dipping their bills, first into one floret and then into another, the sun, as usual, shining bright upon their varied and beautiful plumage. The long-tailed or bird of Paradise humming-bird was particularly striking, its long feathers waving as it darted from one flower to another. I was so much delighted with this sight, that I visited the spot again in the afternoon, after a very long and fatiguing day's ride, accompanied by my wife, on horseback, when we enjoyed the scene before us for more than half an hour. In this Magazine (Vol. I. p. 371.) there is a note furnished by Mr. Rennie, respecting the food of the humming-bird. Mr. Rennie is of opinion that the *T*rochílidæ do not feed on honey, but that their food is insects. I have related what appeared to be a fact, in proof of the general opinion of their eating honey being correct. I gathered a bunch of the flowers of the aloe, but did not perceive any insects in them; and I have known several instances of humming-birds being kept alive for some time by feeding them with sugar and water: further, when birds make insects their prey, it is by a sudden darting upon them; whereas the humming-bird is fluttering some seconds at each flower, as if employed in sipping honey, rather than in catching insects.

[The paragraph above referred to (viz. Vol. I. p. 371.) deserves perusal. In amplification of humming-bird history, we here present, from Waterton's *Wanderings in South America*, an extract which has lain some time by us. — *J. D.*]

"The humming-bird, though least in size, yet, from its glittering mantle, is entitled to the first place in the list of the birds of the New World. It may be truly called the bird of paradise; and, had it existed in the Old World, it would have claimed the title, instead of the bird which has now the honour to bear it. See it darting through the air almost as quick as thought! now it is within a yard of your face! in an instant gone! now it flutters from flower to flower, to sip the silver dew: it is now a ruby, now a topaz, now an emerald, now all burnished gold! It would be arrogant to pretend to describe this winged gem of nature, after Buffon's elegant description of it. Cayenne and Demerara produce the same humming-birds. Perhaps you would wish to know something of their haunts. Chiefly in the months of July and August, the tree called Bois Immortel, very common in Demerara, bears abundance of red blossoms, which stay on the tree for some weeks; then it is that most of the different species of humming-birds are very plentiful. The wild red sage [*Sálvia* splendéns *Ker*, perhaps.—*J. D.*] is also their favourite shrub, and they buzz like bees round the blossom of the wallaba tree. Indeed, there is scarce a flower in the interior or on the sea-coast but what receives frequent visits from one or other of the species. On entering the forests, on the rising land in the interior, the blue and green, the smallest brown (no bigger than the humble bee, with two long feathers in the tail), and the little forked-tail purple-throated humming-birds glitter before you in ever-changing attitudes. One species alone never shows his beauty to the sun; and were it not for his lovely shining colours, you might almost be tempted to class him with the goatsuckers, on account of his habits. He is the largest of all the humming-birds, and is all red and changing gold green, except the head, which is black. He has two long feathers in the tail, which cross each other; and these having gained him the name of Karabimiti, or Ara humming-bird, from the Indians. You never find him on the sea-coast, or where the river is salt, or in the heart of the forest, unless fresh water be there. He keeps close by the side of wooded fresh-water rivers, and dark and lonely creeks. He leaves his retreat before sunrise, to feed on the insects over the water; he returns to it as soon as the sun's rays cause a glare of light, is sedentary all day long, and comes out again, for a short time, after sunset. He builds his nest on a twig over the water, in some unfrequented creeks: it looks like tanned cow-leather. As you advance towards the mountains of Demerara, other species of humming-birds present themselves before you. It seems to be an erroneous opinion that the humming-bird lives entirely on honey-dew. Almost every flower of the tropical climate contains insects of one kind or another: now, the humming-bird is most busy about the flowers an hour or two after sunrise, and after a shower of rain; and it is just at this time that the insects come out to the edge of the flower, in order that the sun's rays may dry the nocturnal dew and rain which they have received. On opening the stomach of the humming-bird, dead insects are almost always found there." (*Waterton.*)

The Green or Esculent Turtle. (*White's* Selborne, p. 148.) Among my notes made on my voyage home, in 1823, I find the following memorandum, dated the 3d of July: — "At 10 A. M. saw the Island of Grand Cayman; at 11, a canoe came alongside with nine turtles, the largest weighing 150 lbs., the smallest about 15 lbs. The owner offered them for sale, and wanted 10*d.* Jamaica currency (7*d.* sterling) per lb.: the captain said it was too much, and the turtler went away, but returned again in twenty minutes, when Mr. S. (a passenger on board) bought six, at 9d. per lb. The turtles on board ship are kept in puncheons of salt water, which is changed every four or five days. A hole, about eight inches square, is made in the bulge of the puncheon, to admit air and food consisting of chopped plantain stalks and fowls' entrails; but many turtles never eat any thing during the whole voyage. Turtles will sometimes weigh more at their being landed here than when shipped in the West Indies; others, again, fall off considerably; but much depends upon the weather, and attention to changing the water frequently. The price of turtle, in Jamaica, is the same as that of beef. Sailors on board ships bound to Honduras, for mahogany, make an agreement with the captain that they shall not be obliged to *eat turtle* more than two or three times a week. The eggs of the turtle are globular, the shell is soft like parchment, and is readily indented by pressure: although not unpalatable, many people do not like them, especially at first eating.

Lizards. (*White's* Selborne, p. 54.) Lizards abound in Jamaica, and are of numerous species. Cats eat them very commonly, but it is always noticed that they do not thrive on such diet. There is one small sort, not much bigger than the English eft [*Lacérta* vulgàris L.], which creeps about the walls, inside the houses: it is considered wrong to disturb it, as the natives believe it to be ominous of a happy increase in the family. I have specimens of three species, each of which is somewhat interesting. One is about a foot long, and had the power of changing the colour of its skin from a greenish hue, its ordinary tint, to all the shades of yellow, green, blue, and brown. The second kind, about the same length, is called by the negroes the galley wasp: they are much afraid of it, but, I believe, without good reason. It is true that it is bolder than other lizards, and will sometimes show fight when attacked; but its bite (if it ever does bite) must be almost harmless. The third is a small grey lizard, very uncommon; this being the only one I saw during twenty years' residence: it was on the high road, and was discovered by my servant, who (according to my rule) was riding before me. I desired him to catch it: he refused, saying, "he could not; that it was bad lizard; and, if he touched it, his fingers would drop off, joint by joint." As there was no reasoning against a prejudice like that, I dismounted, and caught it myself.

Snakes eat lizards, and generally gorge the head of the lizard and its fore legs first; in which case you see the tail and hinder legs projecting out of the snake's mouth: but it sometimes happens that the snake seizes the lizard by the tail, when its head, with its bright eyes, will be seen peeping out of the destroyer's mouth, quite alive, and struggling hard, but in vain, to get away. [See Professor Henslow's description of a parallel case with the common British snake and frog, Vol. IV. p. 279.] It is well known how slowly the serpent tribe swallow their food [The *Bòa constríctor* will, in England, swallow a live rabbit with the speed of thought.—*J. D.*]; and, as the lizard is very tenacious of life, its lower extremities are pretty well digested before the head and upper parts are dead or nearly swallowed.

Several species of lizard have a power of projecting and contracting a fold of the skin, which covers the throat, in a very curious manner: the creature is always standing still when it does this; the projected portion of the skin is spotted of a scarlet colour. Possibly this peculiarity may enable the lizard to get its food more readily, by attracting the attention of flies and other insects.

The guana, or esculent lizard, is no longer found in Jamaica. I once saw a man hawking one about the streets of Spanish Town, in search of an epicure who would be its purchaser; the man told me he brought it from St. Domingo. It was of a light brown colour, and about two feet long.

Crabs. The land crabs in Jamaica* are of two very distinct species, the white and the black, although described by systematic writers as being only varieties of the *Cáncer rurícola.* The black crab is found abundantly in the eastern and northern parishes of the island during particular periods of the year: it is of the blackness of the lobster, and of a very light and handsome shape, as compared with any other species: it is very active upon its legs, and runs fast. Most persons conversant with the delicacies of foreign regions have heard of the deliciousness of this creature as an article of food; and, in proof of the truth of such opinion, I may mention the circumstance of having dined in company with a gentleman, at his first meeting with the black crab, who had nothing of the epicure or gourmand about him, but habitually gave the preference to the plainest food, and avoided spices, wine, and other luxuries in ordinary use with other people: but the black crab proved too much even for this practical philosopher in diet and regimen; and so completely did it get the better of him, that, after eating two or three mouthfuls, he very deliberately put down his knife and fork, to express more leisurely and emphatically his admiration of the exquisite food then for the first time before him; declaring that all he had ever read, heard, or imagined, appertaining to that or other delicious productions, fell short, infinitely short, of the reality he then enjoyed. There is a very good general history of this curious animal, under the article Cancer, in Rees's *Cyclopædia.*

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* A species of land crab also abounds in India. Bishop Heber states that "All the grass land through the Deccan generally swarms with a small land crab, which burrows in the ground, and runs with considerable swift-

The white land crab is very abundant in the lowland districts of the south side of the island: it is rather larger than the black, and not so handsomely shaped, or so active in its movements. During my stay at Port Henderson, in June, 1823, there were some heavy showers of rain after a long-continued drought, when the crabs came out of their holes in vast numbers: they entered and walked all about the house. The weather being very sultry, I had my chamber door open at night: the crabs came into my room, and made a rustling noise, by laying hold of a dry goatskin (used as a covering to my portmanteau), which awoke me. They came to the bedposts, and, being awkward creatures to deal with in the dark, I was satisfied with watching that they did not climb up the bedposts, and get into the bed. The servants, and among

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ness, even when encumbered with a bundle of food almost as big as itself. This food is grass, or the green stalks of rice; and it is amusing to see the crabs, sitting, as it were, upright, to cut their hay with their sharp pincers, then waddling off with their sheaf to their holes, as quickly as their sidelong pace will carry them." — *J. D.*

them my own man James, caught a great many. James would catch four dozen in two or three hours, and then take them to Spanish Town (distant five miles) where he sold them at four for fivepence, or five shillings currency (better than three shillings sterling) for the lot. They are pretty active, and move off briskly at the approach of danger, and hold up their claws, which are large and strong, in a menacing manner, ready to punish any invader. The hogs reared in the neighbourhood are accustomed to them, and kill and eat them. It is quite diverting to see the pig make the attack. He places one of his feet very cautiously, but quickly, upon the crab, and soon cracks the claw with his teeth: however, he sometimes fails; and the crab instantly seizes him by the nose, and makes the hog run off, shaking his head, and squeaking most piteously. These crabs are very fine eating, and very much superior to the sea crab taken on the coast of Jamaica, although inferior in exalted flavour to the black crab. The white crab, like all its congeners, casts its shell periodically. For some time after the old covering is thrown off, the new coat is very soft, and hardens gradually as it becomes converted into shell by the secretion of earthy matter: while soft, they are called leather-jackets, and are esteemed particularly fine, being very fat, and the whole eatable.

Insects in Jamaica which are either troublesome or injurious. (*White's* Selborne, p. 89.) The insects which annoy residents in the West Indies are the following: — the mosquito, the sand fly, the bottler, and the chigo.

The mosquito is not distinguishable from the common gnat by ordinary observers, and, as Kalm says, is a variety of the Cùlex pìpiens. In Jamaica it abounds in all lowland situations almost through the whole year. Those who are fortunate enough to live at an elevation of 2500 feet are exempt from the sharp attacks of this creature, which does not breed at a height where the climate is cool: new comers are particularly obnoxious to its assaults. To show the power of these little tormentors to alter the physiognomy of a person, I may relate the following anecdote: — Captain Newbolt, of the ship Sir Edward Hamilton, having spent the day with me, and enjoyed his wine, which proved a mosquito dose, he slept upon the sofa in the hall, without any mosquito net. He must have lain so as to expose an exact half of his face to the operations of the enemy, who attacked him in such numbers, that, when I saw him next morning, his appearance was both curious and ludicrous: the left side of his nose and face was precisely as I had seen it the day before; but I would defy any of his oldest acquaintance to have recognised him, had they seen the right side of his countenance only, so hideously was it swollen.

The sand fly is a very minute dipterous insect, which abounds in the lowland districts of Jamaica. Like the mosquito, it is formidable by its numbers: it particularly attacks the ankles and legs, seldom the face or hands.

The bottler, as it is commonly called, is also a dipterous insect. It appears very small when it settles on the skin, but its very dilatable abdomen receives a goodly quantity of the purple stream. It causes none of that intolerable itching which follows the punctures of the mosquito and sand fly.

The chigo, I apprehend, is a species of *A'*carus. The parent insect penetrates the skin of the toes and feet, and deposits its eggs there: after a while they hatch and grow, when they cause at first what is considered by some a very delightful sensation, resembling titillation; however, in time, swelling, inflammation, and violent itching follow, when it is usual to call one of the female servants to pull the chigo, as the operation of extraction is called. The instrument employed is a fine needle, with which the skin is opened and dissected carefully off and around a membranous bag, which contains the nest of young chigoes; and, at length, this is dexterously effected, and the bag, in size of a small pea, is removed. The hollow is filled with tobacco ashes, or a drop or two of laudanum, and all is soon quite well.

The above sources of annoyance are, in truth, after all, but minor evils, and have been much exaggerated by many who have described them. I lived among them above twenty years, and experienced very little inconvenience. It is true that I indulged myself, by wearing mosquito boots, made of brown holland, when I visited the lowland districts, where mosquitoes and sand flies are more numerous, and find ready entrance for their proboscis through a silk or a fine cotton stocking. At night, a good mosquito net, which has been well tucked in early in the afternoon, effectually excludes them.

The insects which are hurtful in the house are the ant, and especially the cockroach.

The ant is of several species. A small kind, called the sugar ant, so named on account of its fondness for sugar and any fluid that may contain a portion of that substance, is vastly numerous. In a few minutes after spilling on the table a little lemonade, sweet wine, or tea, these little creatures are seen in great numbers coming along the floor, ascending the legs of the table, and crowding round the little pool of liquid as closely as they can stow themselves, sipping their fill, to be followed by others, until the whole is removed.

A larger species of ant attacks the fruit, meat, and whatever eatable may be in the larder, if it can obtain access there. To prevent this evil, the safe can only prove so to its contents, by either being suspended from the ceiling by a rope that is frequently tarred, or placed on a stand whose legs rest in leaden boxes filled with water, which is changed frequently, or a pellicle of dust would form, and soon give transit to these light-footed creatures. The large red ant is seldom seen in the house; but I recollect, on one occasion, that a host of them made it their thoroughfare. About four o'clock in the afternoon, they entered the front piazza, in irregular but continuous lines of three or four files, passed through the hall, and went out at the back door, and down the wall. This procession lasted, without ceasing, for above two hours. Numbers were killed, but it was idle to continue the slaughter, as it made no difference in regard to those which were to follow continuing their march.

The wood ants in Jamaica construct arched galleries. To destroy them, you have but to make an opening in the gallery, and drop in a little arsenic; the ants will eat it, and of course die; being cannibals, they are eaten by the others, and the whole are speedily destroyed. I have done this more than once with perfect success.

The cockroach is of all insect annoyances the greatest, both in size and circumstance. It eats the bindings of books after they have been handled, and any perspiration has dried upon them; leather of all kinds that has been used, as gloves, harness, boots, and shoes. They crawl over and eat fruit and vegetables, leaving their fæces and an intolerable stench wherever they go. They also eat the corks of bottled wine, cider, or porter, so as to give exit to the liquor; and it becomes necessary to protect the corks by dipping them in quicklime and water; and further, they go into empty bottles, and render them difficult to clean, and almost impossible to sweeten. Of all the plagues of Jamaica this was the object of my greatest abhorrence. In that island, no parchment is used for wills, deeds, conveyances, or any legal document; for, were it used for such purposes, the cockroaches would have no mercy upon it, if accessible to their destructive powers; and a man's title to land or other property would hold good but a very short time, if it came in their way.

As some set-off to the foregoing annoyances from insects, I may add, that, owing to feather-beds, coloured or woollen bed furniture, or carpets, not being in use there, bugs and fleas are seldom seen.

Scorpions are frequently met with, but are little feared; as people are generally on their guard when meddling with things or places in which they are apt to conceal themselves. On one occasion, I knew a lady stung when drawing on her glove, in a finger of which a scorpion had concealed itself: at another time, a child of mine cried out lustily, directly after the nurse had put his boot on; and on taking it off, a scorpion was found, which had stung his toe. The greatest number of scorpions I ever saw was on board the ship in which I came to England in 1821. She had a large quantity of logwood on freight, in the hollows and crevices of which scorpions were concealed. One evening a young gentleman who came home under our care was upon his knees, in the act of saying the Lord's prayer, previously to going to bed, when he suddenly screamed violently (to Mrs. Sells's great terror), exclaiming, "corpion! corpion!" clapping his hand to the upper part of his thigh: on taking off his trousers, a large scorpion was found. The part was directly rubbed with rum in which scorpions were immersed, which is a favourite remedy with sailors. I should say the sting of a scorpion is commonly not so severe as that of a wasp.

The centipede is not uncommon; but I rarely knew any one bitten by it.

Flies. It is well known that flies will deposit their eggs on any surface which affords a suitable nidus for them. I remember a gentleman's son who suffered severely from the larvæ (maggots) of a fly, which proceeded from eggs that had been laid in the ear; but the most extraordinary case of this sort which has come to my knowledge occurred in a negro man at Kellitt's Estate, in Jamaica. He was a tradesman, and a very intelligent fellow. When I first saw him, his nose and cheeks were very much swollen, rendering his face hideous; and he suffered most severe pain. I immediately suspected the cause, and soon succeeded in making the residence of the maggots so uncomfortable to them, by application of turpentine and olive oil, with green tobacco juice, up the nostrils, that they came away gradually; but it occupied at least a fortnight before the whole were removed, so deeply lodged were they in the nasal passages. I desired the man to keep a tally of the numbers of his tormentors; and he did so, I have no doubt, faithfully, after which he handed it to me, and it is still in my possession. It contains 23 crosses (X) for ten each, and V for five, amounting to 235 larvæ of, I believe, the bluebottle fly. Almost all of them were full-grown, and forming, perhaps, such a brood of maggots as never proceeded from any man's head before. Flies abound upon sugar estates; and, when we recollect how often negroes go to sleep in the open air, the wonder is that similar incidents do not occur more frequently. — *William Sells, Surgeon, M.R.C.S. Kingston, Surrey, January* 1. 1832.

An extract from Jameson's *Journal*, exhibiting cases parallel to the above two, may here be fitly introduced. — *J. D.*

Various instances are on record of winged insects depositing their eggs in the human body. Mr. Bracey Clark gives the case of an ox gadfly which produced bots in the jaw of a woman. Lempriere records the case of a lady in Jamaica who died of the maggots of a large blue fly, common in the West Indies. The *Œ́strus hóminis*, or human gadfly, is not often met with; but in Jameson's *Journal* for April, 1830, an authenticated case is given of one of the larvæ having attained the perfect state in the back part of the arm of a sailor. This sailor, while at work, " usually wore his shirt-sleeves rolled up above his elbows; and while in George Town, Demerara, he generally slept on deck. It is easy, then, to suppose that the *Œ́strus*, or parent fly, had availed itself of a proper opportunity to deposit its egg upon his arm, probably by a slight puncture of the skin, by means of the ovipositor with which it is furnished. When the larva had attained its full size, it dropped out, instinctively searching for a covering of natural earth, in which to undergo the intermediate state of pupa, which it is destined to assume for a time before it becomes a winged insect. The instinct of the parent, however admirable under ordinary circumstances, was, of course, insufficient to provide against the accident of Killock's (the sailor's name) being a seafaring man; and the larva could not have attained the perfect state, for want of the proper nidus in which the pupa is accustomed to repose." (*Jameson's Journal*, April 1830, p. 287.)

POLYNESIA.

Botany of the South Sea Islands. — The following esculent plants and timber trees are found in the Island of Tahiti, in the Southern Pacific Ocean: —

Esculent Plants. — Artocárpus incìsa and its varieties (the bread-fruit tree) are among the valuable indigenous productions of the fertile and beautiful Island of Tahiti, where, from some trees bearing at later periods at some parts of the island, the fruit can be procured during the whole year. This tree is also indigenous to the islands forming the Eastern Archipelago; but the fruit does not attain the perfection of the Polynesian: it is called by the Malays, sukun. They have also a variety with seeds, which is called by a distinct name, kalawi. This variety I have seen at Erromanga (New Hebrides group), and it is also found at the Navigators' and Marquesas Islands: I have seen, at the former place, varieties similar to those which at Tahiti are destitute of seeds; although, at Navigators', the fruits were full of them. There are no species at the Society Islands containing seeds;

it is thus accounted for by Labillardière: — "The abortion of the seeds doubtless arises from the custom which the natives have of propagating it by suckers; and in this respect it differs particularly from the wild species, the fruits of which are much smaller, fewer in number, and filled with large kernels which are rather difficult to digest."

The general name for the bread-fruit tree is maiore, of which there are twenty-four varieties; and each has a distinct native name, as follows: —

1. Paea. This is a mountain bread-fruit: the fruit is long, of a large size, and very rough or tuberculated.
2. Rare. The fruit is round, with a bright epidermis.
3. Maire. One of the best kinds: it is a large and round fruit, with rather a smooth skin, and the leaves are more divided than in any of the other varieties.
4. Rautia.
5. Buero.
6. Raumae.
7. Aravei. A long fruit with smooth skin.

8. Pehi.
9. Peiahuri.
10. Tatara.
11. Piiplia.
12. Iofai.
13. Faara.
14. Opiha.
15. Ofatia.
16. Roru.
17. Oviri.
18. Otea.

The fruits of these last-named eleven varieties are of large size.

19. Pafara.
20. Afatu.

Both these bear small and round fruit.

21. Tao.
22. Pafal.
23. Anuanu.
24. Maiore maohi.

The last is the common bread-fruit (maiore signifying bread-fruit, and maohi common). The leaves, as well as the fruit, attain a very large size.

The leaves of the different varieties vary in their form as well as size; but most of them are large, some measuring from 2½ ft. to 3 ft. in length, and from 20 in. to 2 ft. in breadth: they are villous, rugged, more or less deeply cut, and, on being broken, are found to contain a white viscid juice; which is also collected (by incisions being made) in abundance from the trunk of the tree, and is found, on trial, an excellent substitute for pitch. This tree attains the height of from 50 ft. to 60 ft., and a circumference of 5 ft. or 6 ft.; the timber is excellent, and durable even when kept in water; the colour of the heart is reddish, and the sap-wood, which is not durable, of a light yellow; the wood is soft, and is used by the natives for building their vessels, as well as for a variety of other purposes. Some of the native cloth (named hobuu and aaone) is manufactured from the bark of this tree, after undergoing the same preparation as the bark of the auté or paper mulberry tree (*Broussonétia papyrífera*).

Dracæ̀na terminàlis (or ti of the natives). There are also several varieties of this plant. The root contains a quantity of saccharine liquor; it is long and fusiform, and is baked and eaten by the natives; the leaves furnish an excellent provender for cattle, and form a good sea-stock for that purpose; rum has also been distilled from the roots. The varieties are seven in number: —

1. Tiura.
2. Mateni.
3. Rauroa.
4. Abuabu.
5. Taratarataurоа.
6. Oheohe.
7. Ti, maohi.

À*rum esculéntum.* The varieties of this plant (the taro of the natives) are also very numerous, and are as follows: —

1. Poitere.
2. Poti.
3. More.
4. Onoa.
5. Veo-oa.
6. Veo-uru.
7. Uute.
8. Anuanu.
9. Huararo.
10. Papeata.
11. Hoahoa.
12. Fafa.
13. Iihi.
14. Bura-uute.
15. Vainia.
16. Anatia.
17. Pehu.
18. Maabuta.
19. Vaiohuna.
20. Mapo.
21. Mauroa.
22. Tara.

The two following are both mountain and lowland taro; the third is a mountain taro: —

1. Abura.
2. Abura ute.
3. Ape.

The 7th and 14th of the varieties before mentioned, namely, Uute and Bura-uute, yield a juice of a beautiful purplish colour.

Of Mùsa, Plantain Tree, or Meia, the varieties are as follows: —

1. Orea.
2. Avae.
3. Huamano.
4. Tavara.
5. Apiri.
6. Rori.
7. Pivai.
8. Pau.
9. Ovatavata.
10. Marei.
11. Hai tea.
12. Hai oa.
13. Papa.
14. Papa-ati.
15. Parua.
16. Taioura. This variety has foliage of a dark purple colour.
17. Toro.
18. Oio.
19. Papai.
20. Buroini.
21. Parafatu.
22. Nei nei.
23. Bute bute.
24. Habua.

The Fei, or Mountain Plantain, has also several varieties, which are found growing luxuriantly on the declivities of the mountains, as also in the elevated valleys; the native names of the varieties are as follows: —

1. Aiori.
2. Afara.
3. Faraureva.
4. Ruteva.
5. Orea.
6. Aoha.
7. Mahini.
8. Rutu.
9. Tipao.
10. Poutia.
11. Aururu.
12. Eve.
13. Haa.
14. Faraoburoa.
15. Tarimane.
16. Mahiti.
17. Apito.
18. Piatoto.
19. Fanautaata.

Timber Trees. — There are several valuable timber trees indigenous to this island; among them are the miro, apape, tamanu or ati, mara, faifai, purau, aito or toa, tou, &c. &c.

The Miro (*Thespèsia popúlnea,* formerly *H*ibíscus *p*opúlneus) attains the elevation of 45 ft. to 50 ft. and a circumference of 6 ft.: it is a tree usually of crooked growth, but the timber is hard and durable, and very suitable for the timbers of ships. When first cut, the wood is red; but, by exposure, becomes of a reddish brown or variegated colour, somewhat resembling the rosewood. This tree is indigenous to the Philippine Islands (as well as every other part of India), where it is called Banalo. On cutting the immature fruit, it was found to contain a viscid yellow juice, resembling gamboge in colour, which mixes readily with water, and is applicable for water-colour drawing. The flower-buds and calyx also yield this colouring matter, but the seeds do not possess it.

The Apape grows very straight, and towers to the elevation of 40 ft. without a branch, and to 60 ft. or 70 ft. with its branches; in circumference it is from 8 ft. to 10 ft. The timber is of a pinkish colour, and very durable; a gum resin exudes from the tree.

The Mara is an elegant tree, and attains the height of 40 ft. or 50 ft., and a circumference of 5 ft. or 8 ft. The wood is hard, and is used for the keels of vessels, boats, &c.

The Faifai resembles the apape in its mode of growth, and attains the height of 50 ft. or 60 ft., and a circumference of 6 ft. or 8 ft. The wood is of a yellowish colour, durable, and valuable for plank or spar.

The Purau or Fau (H*ibíscus tiliàceus*) is usually a tree of crooked growth, attaining the height of 30 ft. or 40 ft., and a circumference of 4 ft. or 5 ft. There are several varieties of this tree, of which two are highly esteemed by the natives, the white and blue. The wood is tough, light, and durable, and is used for house or ship-building, as well as for a variety of other purposes: both the white and blue are used for those purposes, but the blue is preferred. The inner bark of this tree is used in the manufacture of ropes, and also in the manufacture of a fine mat, named purau, which is highly esteemed, and usually worn by the chiefs. This tree is abundant among the islands forming the Eastern Archipelago, where the bark is also used in the manufacture of ropes.

The Aito or Toa (*Casuarina equisetifólia*) is a very elegant tree, which, together with the Tamanu or Ati (Calophýllum inophýllum) were formerly regarded as sacred, and were planted in the morais. On visiting different parts of this island, the situation where one of the morais [native burial places] formerly existed was usually indicated (even where no ruins existed) by the presence of several of these trees, which cast a gloomy shade over those spots formerly the scene of so many human sacrifices. This tree is of very handsome growth, and has a drooping melancholy appearance: it attains the elevation of 60 ft. or 70 ft., and a circumference of 6 ft. or 7 ft. It is a tree of slow growth, and the wood is very hard and durable. It is used by the natives for a variety of purposes. It is not so abundant at Tahiti as at the Leeward Islands and the Island of Rurutu. The bark of the tree is used by the natives for dyeing a dark red colour; and the ashes of the wood yield a quantity of alkaline, which has lately been used in the manufacture of a kind of coarse soap.

The Tou Tree (*Córd*ia *orientàlis*) attains the elevation of 50 ft. to 60 ft., and a circumference of 6 ft. to 8 ft.; and bears clusters of handsome orange-coloured flowers. The wood is of a dark red colour, and is used for framewood, &c. When it has attained a large size, it is usually found rotten in the heart which prevents its being used for larger purposes. The leaves of the tree are used by the natives as a dye, combined with the juice of the mati (*F*ìcus prolíxa), which forms a fine scarlet colour used in dyeing their native cloth.

The Fern Tribe is numerous at this island, and some of the species are very elegant; among others may be mentioned that beautiful umbellated fern, the Schizæ`a dichótoma, which is found growing in moist and shady situations: it is figured in Hooker's *I'cones* F*ílicum;* but a dried specimen, from which the drawing seems to have been made, cannot convey the elegant appearance of the plant when seen growing in its native woods. On the high mound, built of coral stones, which still remains of the great morai at Mahiatea, about two miles from Mairipehe (and which is about 20 ft. high, and of a great length), I gathered some specimens of a species of *P*olypòdium, which the natives call atua buaa, or pig's god: it was so named, because they considered it, in their idolatrous days, the god of the pig; and, on a sow littering, it was brought and placed before her, to help her in time of trouble. I suppose that now, as the natives have abolished their idols, the pigs have also lost their deity. There is a fern which grows at the Society Islands, and also at the Island of Rurutu, called nahi by the natives; the fronds attain a very large size, with alternate pinnate leaflets, bulbous at their origins. It is found growing in good soil and in moist land; it is the Angiópteris erécta, and is well figured in Hooker's *I'cones* F*ílicum.* It has a pleasant fragrant smell when just gathered, which it loses in a dried state. The Davállia sólida was abundant on all trees; and also the Gleichèn*ia* Hermánn*i*, which is correctly figured in Hooker's *I'cones* F*ílicum.* The Acróstichum aúreum, or aoa of the natives, abounds by the margins of the rivers, the fronds attaining the height of 5 ft. or 6 ft.; and a large species of Lycopòdium grows very abundantly on a plain between the isthmus (Taravao) and Vaitore.

The Atai (*Erythrìna Corallodéndron*), viri-viri of the Sandwich Islands, with its bright red papilionaceous flowers, and the ahia or jambo (Eugèn*ia* malaccénsis), also in flower, occasionally added gaiety and beauty to the scenery of this picturesque island. The solitary tree which stood on "One-tree Hill," near Matavai, and which caused that appellation to be given to the hill, was an atai. The wood of this tree is not used. The cuttings are used for fences, and readily take root.

Among other Shrubs and Plants are the following: — The pumapé, a species of Metrosidèros; the atoto, a shrub bearing blue flowers, a species of Desmòdium; and the motuu, the Melástoma malabáthrica (*Banks* and *Solander*). The berries of the last yield a juice of a bluish black colour, but are not used by the natives. The oporo, a small species of *S*olànum, bearing dark-coloured fruit. The mou (*C*ypèrus) is abundant, and there are several species among them. The mou raupo, mou taviriava, mou maohi, the fibres from the stalks of which are used for straining kava, &c. The *Sophòra* tomentòsa, named pofatuaoao by the natives; a shrub named apiri, a species of Dodon*æ`a*, fillets of which were formerly used for binding around the heads and waists of the victors after a battle, and when they went in pursuit of the vanquished. — *George Bennett, F.L.S. M.R.C.S., &c. London, Dec.* 10. 1831.

ART. II. *Retrospective Criticism.*

CORRECTIONS to the last Number. — For " Planària cornùta *Johnston,*" p. ~~344~~—346. read " Planària vittàta *Montagu;*" and see p. 429. of the present Number for the reasons. — *J. D.*

Luminosity of the Ocean. — I am happy to perceive that the attempt which I made (Vol. IV. p. 505.), to reconcile the conflicting opinions of naturalists upon this remarkable phenomenon, has called forth the additional interesting remarks of that indefatigable observer of nature, Mr. Bowman (Vol. V. p. 1.); from which it is evident that he is disposed to coincide in my opinions, which are simply as follows: — 1st, That the light in general originates in some matter or other (the exact nature of which is to be ascertained only by chemical analysis), with which the surface of the ocean may be impregnated, so as to produce the effect of emitting its luminosity when disturbed; and, 2dly, that Mollúsca, Medùsæ, Crustàcea, &c., may either, by mere contact with, or by feeding upon, or imbibing, such matter, obtain the property of emitting, at second hand, this luminosity.

The only minor point on which Mr. Bowman and myself differ is, that I had imagined that it is only upon the contact of this matter with the atmosphere that light is given out; whilst Mr. Bowman (p. 2.) thinks that this cannot be the case, " since it must always be in contact, from its lying on the surface; yet," adds he, " we have abundant proof that it is only excited by disturbance." I fancy, however, that we may respectively say, that " each is right, and each is wrong;" since, although it is evident, as he suggests, that, in all cases, the light is excited by disturbance or motion; it appears equally evident, as I imagined, (at least, when the presence of animals is not observed,) that it is only the portion of the water which comes in contact with the atmosphere that throws out light, and that the water beneath the surface does not exhibit this property.

Upon the subject of the luminosity emitted by various animals in a greater or less state of decomposition, the student may consult a paper in the *Philosophical Transactions* for the year 1800, p. 161., pointed out to me by my friend Sharpe, whose observations I noticed in my former communication upon this subject. This gentleman tells us that the sailors say that the light is caused by the sheathing of the hulk striking fire (steel and flint fashion) with the water, in consequence of the rapid motion of the vessel! — *J. O. Westwood. Jan.* 21. 1832.

A few remarks on this interesting subject are presented by Mr. Woodward, in the last Number, p. 302-3. — *J. D.*

On the Carrion Crow covering her Eggs with the Materials of the Lining of the Nest. — " The carrion crow (Córvus Coròne), for example, who lines her nest with wool and rabbits' fur, always covers her eggs with a quantity of this before leaving the nest." (See Rennie's plan of study in the second edition of Montagu's *Ornithological Dictionary.*) In p. 144., I flatly contradicted this extraordinary statement, on the strength of my having personally visited the nests of divers carrion crows, on the tops of trees (" dreadful trade ! "), for the better part of forty years. The professor still maintains (p. 393.) that " crows in the vicinity of Lee uniformly cover their eggs, after they have begun to hatch, with the materials of the lining of the nest;" and he infers that the crows in the park at Walton Hall are " eccentric crows " for not doing the same thing. (See p. 393.) There are just now seven carrion crows' nests in the trees in my park; and though I watch them with uncommon attention, and every now and then mount up to them, I can find no traces whatever of their covering the eggs with the lining of the nest. Now, will the professor have the goodness to state to us, in the next Number of this Magazine, that he himself has watched the carrion crows, in the vicinity of Lee, for hours and days together, while hatching their eggs; and then, when the birds have left the nest, that he has actually mounted up to them *in propria persona* (not by deputy), and found the eggs covered with the materials of the lining of the nest. Nothing in the shape of hearsay, or of affidavits from others, will satisfy me. I know by long experience of minute attention to this subject, that no crow ever covers her eggs with the materials of the lining of the nest; and the impression on my mind at present is, that the worthy professor has been misled by those who have taken advantage of his want of knowledge of the true economy of the carrion crow. In p. 393. the professor says: — "I speak positively to the fact, as to our crows in Kent; and, I doubt not, some hundreds of testimonies may be got to prove the fact." What? — some *hundreds* of testimonies! How? — when? — where are carrion crows' nests to be watched, and climbed up to, by the prying ornithologist, day after day, in these mournful times of penal proscription to birds of the pie tribe? No sooner is a nest found but it is plundered: the poor owner is considered a rogue and a vagabond; and he who is fortunate enough to kill it is declared to have deserved well of his parish.

When this little snack of carrion is consumed, which, I fear, has been too long already under the noses of your readers, I will then beg to call upon the professor to produce one single well authenticated fact of any rook, in Kent or elsewhere, covering its eggs with the materials of the lining of its nest, either before or after it has begun to hatch. After this, I will inform him I have never yet discovered that any bird, the young of which is blind at the time of its bursting the shell, ever covers its eggs with the materials of the lining of the nest, though I have been in the habit of inspecting birds' nests in banks, in bushes, in trees, in ruins, and on precipices, for nearly forty years. I speak only of land birds; but I am fully satisfied in my own mind that the same thing may be said of sea fowl: though I can bring forward no facts from personal observation, being a total stranger to their mode of incubation. — *Charles Waterton. Walton Hall, May* 11. 1832.

The Nuthatch (*Sítta europæ̀a* L.) *is resident throughout the Year*, in the counties of Dorset, Gloucester, Worcester, Hereford, Kent, Sussex, and Surrey. I make this remark in relation to Mr. W. H. White's statement (Vol. IV. p. 465.), that he has never been able to see this bird about Bedford in the winter season, and that he, in consequence, believes the nuthatch to be migratory in that neighbourhood. I have resided in all the counties I have named above, in none of which is the nuthatch considered an uncommon bird. — *Edward Newman. Deptford, Sept.* 12. 1831.

Montagu, in his *Ornithological Dictionary*, remarks that the nuthatch "remains with us the whole year, but is a local bird, and not to be found in several parts of the kingdom. We have never observed it far north, nor so far west as Cornwall." It does occur, however, in Cornwall, as a list of Cornish birds, lying by us, supplied by Mr. Couch, testifies. Mr Couch, however, observes of the nuthatch, "It is rare in Cornwall."

In recreative rambles round Kensington Gardens, I have several times, during the past winter, if winter it may be called, seen the lively, active, nuthatch (*fig.* 97.) seeking its food among the numerous (not as to species, but individuals) trees with which these gardens abound. My observation has been mainly confined to the south-western extremity of the gardens; and here yew trees prevail, on the minute nuts of which, usually, I suspect, obtained from among the decaying leaves on the ground, the nuthatch appeared to regale, as did also Pàrus cærùleus and màjor; both which, especially

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P. cærùleus, have been, during the winter, either plentifully or frequently there. These two species, in feeding on the yew nuts, crack the shells in the nuthatch's manner, and make so very audible a noise by their quickly reiterated and continuous tapping, as to cause one to think it is the nuthatch one hears. The Pàri, or titmice, do not, I believe, in cracking the shells, infix them into chinks in the trees, but secure them between their feet on the surface of the branch whereon they are standing.

In observing the nuthatch climbing tall trees, as the lime and the elm, when, of course, insects, not nuts, were the objects sought, I noticed that the bird ascended in a very zigzag manner, as, at the end of every few inches in its progress upwards, it diverged either to the right hand or to the left: this, it may be presumed, was less for the purpose of rendering ascent easy, as draught horses, in ascending hills, take a flexuous course, than for the purpose of enlarging its field of search, and so increasing the chances of amplifying its meal. During the winter the nuthatch was very shy, and, as far as my observation extended, quite silent. By the 10th of April and before, it had become, I think, less shy, and rather frequently uttered one or the other of its two notes: these are a short broken twitting, and a short, unmodulated, yet mellow-toned whistle. — *J. D.*

Additional facts on the manners and habits of this interesting bird will be found, Vol. I. p. 328—330., Vol. II. p. 243.; and in Vol. II. p. 484. it is stated to have, when dead, a peculiar odour, which, like that of the greater shrike, when also dead, resembles the scent thrown out by burnt gunpowder. In Vol. IV. p. 171. 275. and 465. mention of the nuthatch also occurs. On this bird, also, some remarks, by our kind contributor, J. M., have been long lying by us; they will be found to confirm previously published notices, and to supply additional information. They are these:—

Jan. 4. 1828. The nuthatch calls. This is a beautiful and lively herald of spring, but not a songster, having only a few short notes, one of them peculiar, and so loud that it may be heard at a considerable distance. It is at all times a busy and cheerful bird, and particularly before breeding time. Its favourite food is nuts of any kind, and tree seeds; it builds and roosts in hollow trees, and is seldom seen in the open fields, unless when in quest of the stones of whitethorn: it may be, therefore, properly called a forester. Its dexterity in opening nuts and the stones of fruit is curious: it fixes the nut in a crack on the top of a post, or on the bark of a tree, and, placing itself above it, head downwards, strikes with great force and rapidity with its strong wedge-shaped bill on the edge of the shell, till it splits it open. Where the food of these birds is plentiful, they have a favourite crack for unshelling the kernels, as sometimes a peck of broken shells may be seen under this crack. — *J. M.*

The Tree Creeper (*Cérthia familiàris* L.) *a Winter Resident* (p. 204.) — Sir, This bird is undoubtedly to be met with in winter as well as summer, in this neighbourhood. I have often watched it at both seasons, while it has been (as J. D. so well observes) "most diligently occupied in entomological research," creeping perpendicularly, and, as it were, by jerks, up the stems and boughs of trees, searching and scrutinising every chink, to the right and left, for the latent insect, which it extracts with its long and elegantly curved bill; a tool, like all those of Nature's manufacture, most admirably adapted to the purpose. But all this has been very accurately described by J. D. (Vol. V. p. 204, 205.) I was not aware of the circumstances mentioned by T. G., viz., that the creeper, during the winter, is in the habit of associating with the different species of titmice. I am, Sir, yours, &c. — *W. T. Bree. Allesley Rectory, March* 8. 1832.

I do not recollect ever having seen the creeper in any society except that of its own species, and never more than a pair of creepers together: the species seems to me to prefer, and delight in, solitariness. As the nuthatch (see the preceding article) is also in its habits, though not in name, a tree creeper, and, as shown above, does in winter associate with the titmice, these coincidences almost incline one to suspect that the creeper of Lancashire must be the nuthatch of other counties. — *J. D.*

Cries of Frogs. — Mr. Blair (Vol. IV. p. 280.) mentions the cries of frogs when pursued by snakes in America. I have heard them from our common frog (*R*àna temporària), under similar circumstances; but possibly the fact may be better known than I am aware of. — *J. S. Henslow. Cambridge, Aug.* 4. 1831.

To the residents in the fens of Cambridgeshire, where frogs and snakes abound, the cries of frogs are very familiar. Half-grown cats, in the excess of their playfulness, occasionally elicit the cries of the frog; for, on encountering one, they follow after and pat it with the foot, to make it jump forward; and when it stops, they will sometimes smell to it, as if curious to know all about it. These processes of enquiry intimidate the frog, and excite its cries. The cries of one once induced me to turn to the spot whence they proceeded, when, lo! a rat, about one third grown, had grasped a good-sized frog by the thigh, and was carrying it off. On stepping towards them, and stamping with my feet, the rat dropped the frog, and retreated into some loose vegetable rubbish lying by, and the frog hopped off; but as I stood still to look at it, the moment all was quiet again, out started the rat, and recaptured his prize, and the cries of the frog were, of course, resumed. I again interfered, and this time drove the rat effectually away. The frog had reason to cry out; for his death would as surely have followed, as that of those bought in the frog-markets of France. I once saw the mangled remains of a frog in a hole in the base of an old broad wall, and the rat itself alive at the same time in this hole; the tail of a land newt (*L*acérta vulgàris), and fractured shells of *H*èlix aspérsa, also lay at the edge and on the floor of the hole. The wall alluded to is in the old botanic garden at Bury St. Edmunds; and this and the other old walls there had, in hard winters, all their cavities near the ground explored, and freed from the snails (*H*èlix aspérsa, and probably híspida of Jeffreys in *Linn. Trans.* also, as a species answering to the characteristics of this abounds there, but is almost too small for the occupation of a rat's time and attention), and the shells more or less perfectly brought to the edge of the holes. It was the land rat which attacked the frog above mentioned; and this happened late in autumn: the rat in the hole alluded to was also a land rat, and the time at which it was seen there the early part of winter: the clearing of snails took place in hard and long frosts, and was probably effected by land rats also. Water and water rats are both near, as the rivers Lark and Linnet pass through the bottom of the garden; yet I rarely or never saw a water rat on the upper or drier land of the garden, but land rats often. In the hole of a water rat, a large cluster of mangled remains of earthworms was once found, and shown to me by the finder. — *J. D.*

Caterpillar of Polyómmatus Argìolus feeding on the Holly and Ivy. (Vol. IV. p. 477. note, and Vol. V. p. 205.) — Sir, As I should be sorry to be the means of propagating error, or of putting forth, as *facts* in natural history, points which are but of doubtful authority, I beg here to state that when I spoke of the caterpillar of Polyómmatus Argìolus feeding on the holly and ivy (Vol. IV. p. 477.), I did not mention the circumstance as of my own knowledge, but merely on the authority, either oral or written, of others. I never saw the caterpillar myself, nor do I know, from experience, on what it feeds: but I have either been informed by practical entomologists, or have read in some entomological work (or perhaps both), that it does feed on the aforesaid shrubs *; and I certainly have been the

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[illegible] ens, in his *Illustrations*, says, the caterpillar feeds on the buck-more ready to believe this statement, from having so repeatedly observed the great partiality of the insect, in the fly state, for these two evergreens.[*] I might add, too, as a corroborating circumstance, that the insect, as I have remarked (Vol. IV. p. 477.) is more than usually plentiful in this neighbourhood, where the holly and ivy naturally abound, and especially about my own premises, on which there are many fine specimens of each tree, particularly of the ivy. Your correspondent, Mr. Ventris (p. 205.), is inclined to think the caterpillar of our little azure blue, like its congeners, feeds on grass, as stated by many entomological writers. I wish some one would institute such experiments as would enable one to ascertain the point without doubt, and communicate the result through your Magazine. The caterpillars, I believe, of most, if not all, of the blues, feed upon grass, or upon the various herbage of which turf is composed in different parts of the country: and though they must be, in some cases, exceedingly abundant, they are yet very rarely met with, owing, probably, to their feeding very near the surface of the ground; or, possibly, like some other caterpillars, coming forth to feed only, or chiefly, by night. P. Argìolu*s*, in the winged state, appears to differ widely in its habits and manners from all its congeners (I speak only of such British species as I am acquainted with): they are mostly to be met with on commons, open pastures, downs, chalk hills [†], &c. They fly low, and frequently settle on the flowers, grass, and other herbage, occurring in such situations. P. Argìolu*s*, on the contrary, rather affects hedges, gardens, shrubberies, and plantations, and is a more restless and high-flying insect, hovering and vapouring [‡] about the trees and bushes. Nor have I observed that it evinces the same partiality for settling upon flowers and plants of humble growth, as it does for settling on the *leaves* of the holly, &c.: I say the *leaves*, for the blossoms are not out till after the season for the spring brood, at least, of the butterfly, is gone by, or nearly so. Since this insect, therefore, differs in the winged state so widely in habit from its congeners, it is not improbable that it may likewise do the same in the larva. But (as already stated) I hope some one will, ere long, be able to settle the question beyond dispute. Yours, &c. — *W. T. Bree. Allesley Rectory, March* 8. 1832.

Irritability of the Hairs of the Round-leaved Sundew (*Drósera rotundifòlia*). — Has not J. E. L. imputed to the sundew a property of which it is totally destitute? He remarks (Vol. IV. p. 135.): — "Drósera, an English genus, which inhabits our marshes, has its leaves clothed with beautiful long scarlet hairs; and if a fly happens to alight upon any of the leaves, these hairs immediately curl over it, and squeeze it to death. Perhaps these hairs may be provided by Providence, in order to catch flies and other insects, from which the plant might obtain nourishment." The hairs of the English Dróseræ, or sundews, have surely no such degree of irritability, and, I believe, none at all. The fringed laminæ of the leaves of the Dionæ`*a* Muscípula, or Venus's flytrap, a native of Carolina, have this power; and, for aught I know, this plant alone. The fly-catching powers of the Dróseræ, or sundews (and these are quite inconsiderable), consist, I believe, solely in the viscosity of the leaves and hairs. The idea of the

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thorn (*R*hámnus Frángula) and holly (*I*'lex europæ`a [*A*quifòlium ?]. See Haustellàta, vol. i. p. 85.

[*] The butterfly is also fond of settling on the Portugal laurel, rhododendron, and other evergreens.

[†] Hence, probably, it is, that such pastoral names as Córydo*n*, Adòni*s*, A'lsu*s*, Aléxi*s*, have been elegantly appropriated, as specific appellations, to several species of this family of *P*apiliónidæ.

[‡] Were an appropriate English name required for this little butterfly, it might well be called the "vapouring blue."

Dróseræ being nourished by the decomposing remains of the flies they capture is possibly more plausible than true, but reminds me of a notable paragraph which, about five years ago, appeared in the *Examiner* newspaper; which stated that a gentleman, furthering this hint as supplied him by Nature, had succeeded in invigorating his plants of Dróseræ, or sundew, by supplying them with *beef.*

A correspondent, signing C. P., presents (Vol. V. p. 110.) some remarks on Drósera rotundifòlia, which shows C. P. to be very intimately acquainted with this elegant and peculiar plant in its native habitats; and it is hoped that C. P. will forthwith communicate the result of his experience, as to the absence or presence, and the degree if present, of a faculty of sensibility in the plant in question. — *J. D.*

Nepénthes distillatòria, Cephalòtus folliculàris, and the Sarracèniæ. — J. E. L., in the same interesting article (Vol. IV. p. 134—136.), makes mention (p. 135.) of the pitcher plant (*N*epénthes distillatória). It may be useful to register here, in conjunction with that, as subservient to future inferences, the existence of a plant in New Holland, botanically called Cephalòtus folliculàris, or New Holland pitcher leaf, which bears a striking analogy to *N*epénthes, in having pitchers considerably similar in structure, while, nevertheless, the plants themselves are very dissimilar in habit. They may be thus contrasted: *N*epénthes distillatória is an evergreen climbing plant, attaining the height of from 12 to 20 ft., and has its large ovate-lanceolate leaves disposed alternately along its stem, and each leaf sustains from its tip a long depending pitcher. In Cephalòtus folliculàris there is no stem, save the flower scape, which is leafless, and but from 1 to 2 ft. high; and although the leaves and pitchers of the plant are produced together in a rosaceous radical tuft, the pitchers are distinct from the leaves, and have footstalks of their own. The pitchers are stated to secrete water, like those of *N*epénthes, and to entrap many insects, especially ants; but this entrapping must arise from their mechanical position alone, or from the enticement held out by their water, as not the slightest sensibility has, I believe, ever been imputed to any part of the pitcher of either the *N*epénthes or the Cephalòtus. It is remarkable, that in the pitchers of both these plants, and in the pitchers of the side-saddle flowers (Sarracèn*iæ*) as well, the pitcher is never closed by its lid, except in the earliest stages of the pitcher's growth; and that, as the pitcher increases in size and age, the lid becomes erect, and ceases to cover the mouth of the pitcher. Should this notice of Cephalòtus at all interest J. E. L., I would refer him to Curtis's *Botanical Magazine*, t. 3118, 3119., for excellent figures, and a detailed description of this wonderful little plant; and living specimens of it, although it is exceedingly rare in England, are thriving thoroughly in one of the stoves at Knight's Exotic Nursery, Chelsea. Figures of the Sarracèn*iæ* will also be found in Curtis's *Botanical Magazine*, in the earlier volumes, and of the Sarracèn*ia* purpùrea numerous fine plants have just been imported into Dennis's Nursery, Chelsea, from the swamps of the United States of America, in which the Sarracèn*iæ* spontaneously grow. It is scarcely in place here, to remark that Professor Lindley supposes the terminal lobe, or lamina, of Dionæ'*a* Muscípula, and the lid of the pitcher in *N*epénthes, Cephalòtus, and Sarracèn*iæ*, to be analogous to the lamina, or expanded portion, of ordinary leaves; while the pitchers of the last-named two, and the pitcher with its leaf-like footstalk in *N*epénthes, are deemed only dilated foliaceous footstalks, with coherent margins. This view, at first sight, seems paradoxical; but the remarkably dilated footstalks in the *A*cǎciæ, which supply the place of real leaves, and other striking modifications of foliate structure which are known, prepare us to admit that the above view is probably a close approximation to a correct one. — *J. D.*

The Flowers, or Heads of Flowers, of the Annual Sunflower, vary not their

Aspect according to the Progress of the Sun in its daily Course. — I have the pleasure to add my testimony to that of J. E. L., expressed to the above effect, in his article in Vol. IV. p. 136. Were the old fanciful theory, so prettily sung by Thomson, in his poem of *The Seasons*, true, a plant with seven or eight heads of flowers open at once, as is sometimes the case, would necessarily have them oddly huddled together, in the efforts of each to stare the sun in the face, from the rising to the setting of the same. — *J. D.*

The Flowers of Campánula rotundifòlia are the "Blue Bells of Scotland," and those of Scílla *nùtans are the Harebells.* — Sir, your contributor, ☞, in reviewing, in your Vol. II., the first volume of Dr. Johnston's *Flora of Berwick upon Tweed*, asks, p. 236., if Dr. Johnston has not erred in identifying the blue bells of Scotland with the flowers of Campánula rotundifòlia *L.*; the reviewer deeming *S*cílla nùtans to be rather the blue bell, and the Campánula rotundifòlia to be the harebell. Dr. Johnston replies to this query in your Vol. III. p. 461., and there shows that the blue bells of Scotland are undoubtedly the flowers of the Campánula rotundifòlia. On this point Dr. Johnston is, without a doubt, perfectly correct; as I shall prove by consequence, when I adduce evidence to show, in answer to the remaining half of the question, that the harebells are the flowers of *S*cílla nùtans, and not those of Campánula rotundifòlia, as suggested by ☞. (Vol. II. p. 236.) Burns, in a letter to Mrs. Dunlop, dated New Year's day morning, 1789, says: — "I have some favourite flowers in spring; among which are the mountain daisy, the harebell, the foxglove, the wild briar rose, the budding birk [birch], and the hoary hawthorn, that I view and hang over with particular delight." Now, as the Campánula rotundifòlia does not flower until two months later than any of these, Burns's harebell must have been the *S*cílla nùtans. — *J. C. Farmer. Nov.* 1831.

On the specific Identity of Anagállis *arvénsis and cærùlea.* (Vol. III. p. 537.; Vol. IV. p. 79. 277, 278. 466. 557.) — Sir, As you were so obliging as to insert an experiment of mine made with the view of ascertaining whether these plants were specifically the same or not; and as one or two of your correspondents have subsequently alluded to my communication; I beg to offer you an extract from a letter which I have received from the gentleman, the Rev. E. Wilson, who furnished me with the seeds of *A*nagállis cærùlea: — "In the spring (1831) I sowed the seed of *A.* cærùlea in a flower border at Chapel Allerton. It had been gathered in 1827, at the same time as that which was sent to you. Twenty-eight plants made their appearance, of which twenty-five had blue flowers, and three had red. Eight plants from seeds of the white variety retained their white colour. Mr. William Richardson has also tried three experiments this summer on the blue pimpernel at Owston, near Doncaster. In each experiment two garden pots were filled with earth, and then some seeds were placed in one pot, but none in the other. The results were as follows: — No. 1. Sandy loam; seeds gathered in 1827. In the sown pot there came up 14 blue and 2 red: in the unsown pot, 1 red. — No. 2. Sandy loam, as before; seed of 1828 from plants raised from the seed of 1827. In the sown pot, 6 blue and 2 red: in the unsown pot, none. — No. 3. Strong loam; seed of 1830 from plants raised from the seed of 1828. In the sown pot, 31 blue: in the unsown, none. Besides the above, a similar experiment was made upon the white variety from seeds of 1828, sown in bog earth. None appeared in the unsown pot, and 9 with white flowers came up in the other." By these experiments it appears how very difficult it is to avoid the introduction of error. The appearance of the single red-flowering plant in No. 1. in the unsown pot, at once nullifies any conclusion that might have been drawn from that and the following experiment, and even throws a shade of doubt over the results obtained by Mr. Wilson and myself. One of your correspondents (Agronome, Vol. IV. p. 557.), I observe, is disposed to ridicule the utility of these investigations; but he must be quite ignorant of their value in a physiological point of view. There is, perhaps, no question in botany, which, at this moment, it is more desirable to settle on the sure basis of experiment, than the law which limits the variation of species. I trust, therefore, that some other of your correspondents will lend their assistance in patiently experimenting upon the specific identity of different plants, and record all their failures as well as their successes, in each case; for it will be only after a multitude of such experiments shall have been carefully performed, that we can expect to arrive scientifically and legitimately at the truth. I am, Sir, yours, &c. — *J. S. Henslow. Cambridge, Feb.* 2. 1832.

Mountains seen through a Haze which Solar Rays can scarcely pierce. (p. 356.) — The interesting article of Mr. Spence, on the meteorology of Switzerland and Italy (p. 353—359.), states that mountains can be seen through a haze which the solar rays cannot penetrate. This is to me a new phenomenon in optics. I have consulted several friends, who, as well as myself, have been eye-witnesses of the phenomena of the mountains of Switzerland, and this fact escaped us all. It is so curious, that it were to be wished other travellers would verify and certify it. At Lyons, Mont Blanc is considered as certain a barometer as that of Torricelli; whenever it can be distinctly perceived at Lyons, rain is certain to fall within the twenty-four hours. I have verified this fact many times, at an interval of thirty years, and I have never found it fail. I am, Sir, yours, &c. — *J. Byerley. London, May* 7. 1832.

ART. III. *Queries and Answers.*

PHEASANTS hatched under white domestic Hens have a greater or less Portion of white Feathers. — Sir, I have been informed by a gentleman, who strongly exemplifies the English character, in being devotedly attached to the sports of the field, that his curiosity has been repeatedly excited by a very singular fact in natural history. If he places the eggs of a pheasant under a white hen, he frequently finds several of the young brood showing a tendency to white plumage; but, in the case of a black hen, the same circumstance has seldom, indeed scarcely ever, occurred. Is it that the colour white is less favourable to the communication of heat, which is the grand agent in the hatching process, and so the young birds have a less vigorous and healthy constitution, discovering itself by a white plumage, which is certainly a sign of degeneracy; or is it one of those many facts which we regard with surprise, but cannot reach with our understanding? An answer will oblige — *B. B. P.*

Hatching of Eggs. (p. 102.) — C. P.'s valuable remarks (p. 102.) on the fact of gallinaceous birds moistening their feathers during the process of hatching deserves to be reconsidered; and this, in connection with the remarks by Mr. Couch, on the hatching of the swallow tribe, expressed Vol. IV. p. 522. As Mr. Couch deems the embryo chick liable to perish from superfluous heat, is it not just possible that wetting the feathers is the means adopted by the sitting bird to modify the temperature of the embryos, as well as also, conformably with C. P.'s suggestion, to moisten the shells? — *An Asker.*

Reptiles in Ireland. — Sir, A query on this subject appears p. 104.; and, as a contribution towards an answer to it, I have to say that I have just received, from a lady who has been for some years a resident in Derry, a fine specimen of the common eft (*Lacérta* vulgàris *L.*), which was taken by herself, and which has travelled safely to London in a vial of spirits.

From this lady I learn the following facts:—There are two species of lizard of very frequent occurrence in the north of Ireland: one is very active, and is completely covered with scales, which must be our common scaly lizard (*Lacérta* ágilis *L.*); and the other is the eft. A very singular superstition is attached by the common people to the latter: they suppose it has a propensity to jump down their throats, in order to make a lodging in their stomachs; and that, when there, it will increase and multiply to a most frightful extent. For every disease there is a supposed cure; and the Irish have theirs for this most novel ailment: the remedy is to seek for a stream running directly southwards, and, having found it, to lean over it with open mouth, when, strange to say, after a due time has elapsed, the lizards come forth from their warm habitation, one by one, and plunge into the water; after which the patient recovers. The eft is commonly known in the north of Ireland by the name of man-keeper, probably with some allusion to this supposed propensity. I am, Sir, yours, &c. — *Edward Newman. Deptford, March* 20. 1832.

Is the Anchovy (*Clùpea* E*ncrasícolus*) found in any freshwater lakes or rivers in Britain? — *O. February*, 1832.

This query is here inserted for the sake of pointing attention to it; the question is incidentally asked, and the circumstances which excited it will be found detailed in the Number for next month. — *J. D.*

Preservation of Insects without eviscerating them. — Sir, I should feel much obliged to any of your readers for a good receipt for the preservation of insects; Mr. Waterton's corrosive sublimate in spirits of wine, which I have hitherto used, being infallible against the ravages of insects; but it does not preserve many specimens, especially those of the order Coleóptera, from decay, unless their inside be taken out: a tedious process, by which many a rare insect is destroyed. I am, Sir, yours, &c. — *M. P. Jan.* 12. 1832.

Microgáster glomeràtus feeds on, and nidifies in, the Bodies of various Species of Insects. — Sir, I am able to reply negatively to Mr. Bree's enquiry (p. 106. note), whether "each species of *I*chneùmon invariably keeps to one and the same species of moth or butterfly." During last summer, I happened, among a variety of other caterpillars, to put about from twenty to thirty individuals of the common cabbage butterfly caterpillar (Póntia brássicæ), and about an equal number of the currant moth caterpillar (*P*halæ'na grossulariàta), into the same breeding-box. More than two thirds of both, at the time when I expected them to be converted into chrysalides, became covered with a number of little cocoons, about the size of cress seeds; and each of these, in the course of three weeks or a month, gave birth to the Microgáster glomeràtus in its imago state: thus proving that, in this instance at least, the *I*chneùmon does not "confine itself to one individual species of moth or butterfly." I am, Sir, yours, &c. — *E. H. Greenhow. North Shields, Jan.* 8. 1832.

A Ball containing Individuals of a Species of I*chneùmon.* (Vol. IV. p. 93.) — In August, 1831, I found several balls, similar to that figured and described in the communication from "H., Great Missenden." (Vol. IV. p. 93.) I conveyed two of them home, and placed them in a box, expecting to find the perfect insect in the spring; but, happening to open the box a few days since, I was surprised to find a great number of small black flies, most of which were dead. Upon referring to Berkenhout's *Synopsis* (the only book I possess on the subject), I made them out to be the *I*chneùmon globàtus. It is even stated that "it breeds in white silky balls, an inch long, which are found frequently on different plants in meadows." I now am anxious to learn, from some contributor, on what substance the caterpillars feed and subsist, and why they congregate to form their family cocoon. — *J. C. Farmer. November*, 1831.

Polyómmatus Argìolus, further Queries regarding. (Vol. IV. p. 477. 558., and Vol. V. p. 109.) — Sir, Two of your correspondents have kindly supplied ready answers to my question, in Vol. IV. p. 477., whether Polyómmatus Argìolus is to be considered a double-brooded insect. These answers are, as I expected they would be, in the affirmative. That of Mr. Newman (Vol. IV. p. 558.), relating to the above insect, as well as to Melitæ'*a* Euphrósyn*e*, and Selèn*e*, appears to be the result of minute personal observation, and carries with it such an air of truth, that there can be no doubt of its accuracy. Mr. Jordan also states (Vol. V. p. 109.) that the "species [P. Argíolus] is, without doubt, double-brooded;" that he has "seen living individuals in April, and again in September this year" (1831). September, I may remark, is rather a late period of the year for these insects; and when Mr. Jordan describes them, as "spreading their azure wings, and flitting from flower to flower," these latter remarks strike me as more applicable to the habits and manners of the common blue (P. I'carus), which is abundant in September, than to those of P. Argìolus, which generally disappears before that time, and is, moreover, a vapouring restless fly, seldom settling except upon bushes (holly, ivy, and other evergreens), and then, for the most part, remaining with its wings closed. May not, therefore, Mr. Jordan have mistaken specimens of the common blue, seen in September, for those of P. Argìolus? I should not have presumed to cast a doubt on the accuracy of this gentleman's statement (which, on the whole, corresponds pretty nearly with the facts observed by others and by myself), were it not that he candidly avows himself to be "*not* an entomologist;" and, to such a person, one blue butterfly may, very possibly, be mistaken for another. I know, by experience, that when persons who are "*not* entomologists" have been shown specimens of some of the rarer blues, they have confidently affirmed that they have seen the same abundantly in this or that neighbourhood; and I have sometimes found it next to impossible to convince them to the contrary. Mr. Jordan will, I trust, excuse the freedom of these remarks, which have been called forth solely by his own honest confession, that he is "*not* an entomologist." I feel obliged to him, however, for his answer; and not the less so, on account of its coming from one who, if not an entomologist, must at all events be (what is, perhaps, better) an observer of Nature herself. The remarks of such a person cannot but be valuable, coming, as they do, fresh, as it were, from the fields and wood; smelling (if I may so speak) of the open air, and consequently less likely to have been biassed on either side by mere book-learning, or the influence of high authorities. I hope Mr. Jordan will attend to the subject of the present notice next season, and communicate his remarks through the medium of your pages. Let me not be here understood to express any doubts as to the insect in question being double-brooded; it appears undoubtedly to be so, at least in some districts (I saw it on the wing, myself, on the 4th of August last, between Dartford and Gravesend). But, again, I would ask, whether any one can assign a plausible reason why the species proves only single-brooded in some parts of England, as it unquestionably appears to be here (at Allesley), where, as I have before said, it occurs in more than usual abundance in the early spring? Is it only in the more southern counties that it appears twice in the season? Kent, Hampshire, Somersetshire, and Devonshire, are, I think, the principal counties in which I have yet either seen or heard of the æstival [summer] specimens. I regret that, in figuring the species (Vol. IV. p. 477.), a representation was not also given of the under side of the insect, which would have precluded all possibility of confounding it with the common blue (P. I'carus). Yours, &c. — *W. T. Bree. Allesley Rectory, January* 6. 1832. [See p. 490. of the present Number. — *J. D.*]

THE MAGAZINE

OF

NATURAL HISTORY.

JULY, 1832.

ORIGINAL COMMUNICATIONS.

ART. I. *Chit-chat.* No. I. By JOHN F. M. DOVASTON, Esq. A.M., of Westfelton, near Shrewsbury.

———" Lords can prate
As amply and unnecessarily
As this Gonzalo: I myself could make
A chough of as deep CHAT." *Tempest.*

SCENE—*Under the trees at Westfelton.* TIME—*After dinner.*

DOVASTON *and* VON OSDAT.

Dovaston.

LOUDON asks of me a Leader for July.

Von Os. On what subject?

Dov. Any. Natural history in general. The Magazine extends very widely; and he wishes something familiar, something popular.

Von Os. Cognizable to all capacities?

Dov. Exactly so. He has plenty of contributors of articles of deep science, extensive information, and effusions of beauty.

Von Os. Such as Bowman, Bree, Waterton, and others: like as in casting the characters at an amateur play; the manager always finds plenty of candidates for the topping parts, but none to discharge ye the underlings.

Dov. Myriads of little interesting incidents occur in conversation, too desultory for a regular article in the work, and too small even for a note at the end: so many a pretty gem is lost by its minuteness, and many a bright ray by its evanescence.

Von Os. 'Tis so on all subjects: the essence of truth and beauty is exhaled in conversation, while what is elaborately written, seems merely the dregs. Try an interlocutory article, where the spirit of the moment

> "One little ray flings through the darkling mind,
> And let it gild each flitting thought minute
> That passes through it, sparkling as it dies.
> As erst in childhood's frolic day I've seen,
> When right against some barn's old-boarded side
> The evening sun flung warm his yellow rays,
> Piercing each inlet hole, the airy motes
> Blaze fitfully, in many a level beam."

Dov. And the best of these is spoiled by writing. Who can weave sunbeams? — and what are gathered dew-drops?

Von Os. Natural history is felicitously suitable to this style, from its exhaustless variety, and adaptability to all minds; admitting, even more forcibly, what Cicero so eloquently says of Polite Literature, in his oration for the poet Archias, — "as calling upon us at all times, ages, and places; employing our youth, amusing our age; embellishing prosperity, consoling adversity; delightful at home, and of easy carriage abroad; soothing our leisure, shortening our fatigue, and enlivening our retirement."

Dov. True. And from the profuse efflux of works now issued to illustrate it, of all sorts, sizes, and prices, it is like to find its way more readily into the higher and lower ranks of society, where it is about alike wanted.

Von Os. The middle, in all ages and countries, have always been the best informed, and most benevolent; the highest and lowest, the most ignorant and callous.

Dov. Ray tells a humorous story, that, after the patiently exploring commissioners, at the end of their long examinations, deliberately confessed their utter ignorance to account for the Goodwin Sands, an old man gravely asserted Tenterden steeple to be the cause.

Von Os. Tenterden steeple!

Dov. Ay; Tenterden steeple: for that those sands first appeared the year it was erected.

Von Os. And the slightest interview with the mass of mankind, any hour, will prove the race of Tenterden philosophers to be far from extinct.

Dov. Particularly with regard to facts relative to natural history: and this is the more lamentable, and perhaps the more surprising, when we consider its unlimited adaptability to all capacities, ages, sexes, and ranks; and, moreover, the absolute necessity of many parts of it to their intellectual existence.

Von Os. There is in our village a slater, very fond of keeping bees. These useful insects, he says, at breeding-time, sweat prodigiously; and each lays four eggs at the bottom of each cell: soon after which, he has observed the combs to become full of maggots, which must be carefully destroyed by smoke! When any one of his numerous family is buried, as the corpse passes out of the house, he carefully loosens every hive, and lifts it up: otherwise, he says, the bees would all die!

Dov. The superstitions about bees are numberless.

Von Os. And yet this poor fellow believes himself inspired with "grace abounding;" and readily undertakes to "*spound*," as he calls it, any verse read to him, however remotely insulated from the context.

Dov. But what would you think of a gentleman I have the pleasure of visiting in the higher ranks, and whose conversation is really a happiness to me, who talks of little young bees? — and really believes that they grow! He smiled at me compassionately when I told him that insects never grew when in the perfect state; but, like Minerva from the brain of Jove, issue full-armed with sharpest weapons, and corslets of burnished green, purple, and gold, in panoply complete: yet is this gentleman a man of genius, wit, and very extensive knowledge.

Von Os. Not in bees.

Dov. He was not aware of the numerous species of British bees; and that several, of a small intrepid sort, will enter the hives, and prey on the treasures of their more industrious congeners.

Von Os. Reasoning from analogy does not do in natural history.

Dov. No; for who, without observation, or the information of others, ever by analogical reasoning could reconcile the enormous difference of size, and colour, in the sexes of some of the humble bees? — or ever discover that in some species there are even females of two sizes?

Von Os. But these never grow.

Dov. Certainly not. Bees, however, hatched in very old cells, will be somewhat smaller: as each maggot leaves a skin behind, which, though thinner than the finest silk, layer after layer, contracts the cells, and somewhat compresses the future bee.

Von Os. No ignorance is so contemptible as that of what is hourly before our eyes. I do not so much wonder at the fellow who enquired if America was a very large town, as at him who, finding the froth of the *Cicàda* spumària *L.* on almost every blade in his garden, wondered where were all the cuckoos that produced it.

Dov. They call it cuckoo-spit, from its plentiful appearance about the arrival of that bird.

Von Os. That is reasoning from analogy.

Dov. And yet I see not why the bird should be given to spitting; unless, indeed, he came from America.

Von Os. The vulgar, too, not only delight in wonders inexplicable, but have a rabid propensity to pry into futurity.

Dov. I believe that propensity is far from being confined to the vulgar.

Von Os. True; but not in so ridiculous a way: as they prophesy the future price of wheat from the number of lenticular knobs (containing the sporules) in the bottom of a cup of the fungus Nidulària.

Dov. The weather may be foretold with considerable certainty, for a short time, from many hygrometric plants, and the atmospheric influence on animals.

Von Os. And from *Cloudology*, by the changing of primary clouds into compound; and these resolving themselves into nimbi, for rain; or gathering into cumuli, for fair weather. This is like to become a very useful and pleasing science.

Dov. It is wonders of this kind, and forewarnings of this nature, that natural history offers to the contemplative mind: in the place of superstitious follies, and unavailing predictions, such as the foretelling of luck from the number or chattering of magpies; and the wonder how red clover changes itself into grass, as many a farmer at this moment believes.

Von Os. Linnæus himself was a bit of a prophet; as, indeed, thus well he might: for experience and observation amount almost to the power of vaticination. In his *Academic Amenities* he says, "Deus O. M. et Natura nihil frustra creaverit [Qu. creaverint?]. Posteros tamen tot inventuros fore utilitates ex muscis arguor, quot ex reliquis vegetabilibus."

Dov. English it, Von Osdat; thou'rt a scholar.

Von Os. "God and Nature have made nothing in vain. Posterity may discover as much in mosses, as of utility in other herbs."

Dov. And, truly, so they may: one lichen is already used as a blessed medicine in asthma; and another to thicken milk, as a nutritive posset. And who, enjoying the rich productions of our present state of horticulture, can recur without wonder to the tables of our ancestors? They knew absolutely nothing of vegetables in a culinary sense; and as for their application in medicine, they had no power unless gathered under planetary influence, "sliver'd in the moon's eclipse."

Von Os. When Mercury was culminating, or Mars and Venus had got into the ninth house.

Dov. 'Tis curious to reflect, that at the vast baronial feasts, in the days of the Plantagenets and Tudors, where we read of such onslaught of beeves, muttons, hogs, fowl and fish, the courtly knights and beauteous dames had no other vegetable save bread — not even a potato!

Von Os. "They carved at the meal with their gloves of steel,
And drank the red wine through the helmet barr'd."

Dov. And when the cloth was drawn —

Von Os. Cloth! —

Dov. They had scarce an apple to give zest to their wine.

Von Os. We read of roasted crabs; and mayhap they had baked acorns and pignuts.

Dov. Ha! ha! ha! — Caliban's dainties. Now we have wholesome vegetables almost for nothing, and pine-apples for a trifle. Thanks to Mr. Knight — push the bottle — here's to his health in a bumper.

Von Os. Who, walking on Chester walls in those days, and seeing the *B*rássica oleràcea, where it grows in abundance, would have supposed that from it would spring cabbages as big as drums, and cauliflowers as florid as a bishop's wig?

Dov. Or cautiously *chaumbering* an acrid sloe, imagine it to be the parent of a green gage?

Von Os. This is the Education of Vegetables.

Dov. The March of Increment!

Von Os. See, see, on the cool dark walk beneath these trees, a silvery fly, wheeling in slow luminous curves, like streaks of fire! Now he alights — see, there are several of them! What do you call him?

Dov. He is *now* called Pôrphyrops spléndidus.

Von Os. And his face *is* purple, or rather of a maroon colour. 'Tis pity but what we had English names for every thing, were it but for the sake of the uneducated.

Dov. Education is not a recollection of words.

Von Os. Do not you think many are deterred from botany by the Greek and Latin terms?

Dov. A few feeble minds may: but every man, woman, and child hourly uses words emerging from languages far more abstruse and obscure than the classical. A common gardener, with a little practice, from a bare catalogue, will shortly remember the botanic terms and names as well as if they were English, with the exception of scratching Priscian a little: the *quantity* is now usually marked. A greater stumbling-block is that of scientific arrangers, so often, and so capriciously, changing the names.

Von Os. There is a capital remark to that effect in Loudon's *Encyclopædia of Plants*, under the word Linnæ'*a*: — "It is to be wished such another man (as Linnæus), with equal talent, industry, and judgment, could be found at the present day, to rescue the science of natural history from the confusion to which it is fast approaching."

Dov. There is too great a fastidious nicety in splitting genera. Nothing can be more felicitous than the Linnæan method of giving each a generic and specific name, its infinite combination, and vast power, contained in two words; but, when once affixed, they should be sacredly held permanently immutable, unless involving some very glaring error.

Von Os. I see the *foraminous* birds take very freely to the pots and boxes you put up to the walls and trees.

Dov. Yes; and that in the tree opposite my book-room window is now tenanted by a pair of nuthatches. They reduced, as is their wont, the entrance-hole with clay, so small, that when they go in or out, they are obliged to push and wriggle very hard. I at first wondered at their reducing it so small: but I had soon reason to approve their precaution, for no sooner had they hatched their young, than the busy starlings, with their strong bills, attempted a forcible entry, and actually broke down part of the mud stoppage; which the intrepid and persevering occupants immediately proceeded to repair, and victoriously fought, with might and main, *pro aris et focis.* The bottom of their *sedile* [roost] (for I can scarcely call it a nest) is always strewn very thickly with the thin *laminæ*, or flaky bark, taken from the upper branches of old Scotch pines: and this the impudent and prying tomtits will throw out profusely. I think the nuthatch a most interesting bird.

Von Os. I have observed that the hole of the little woodpecker is cylindrical, while that of the nuthatch is slightly conical, pointing inwards.

Dov. Did you ever hear of suicidal woodcocks?

Von. Os. Suicidal woodcocks?

Dov. Ay. Being a few years ago at Holyhead, with our friend Bowman and his pleasant family, we scrambled over the rocks to see the fine light-house erected on a detached crag called the South Stack; to which we crossed on a flimsy rickety bridge of ropes, suspended at a tremendous height over the rolling waves that chafed and roared below. When we had ascended the lofty tower into the lantern, the man who conducted us struck with his fist, very hard, the large panes of plate glass, and bade us do the same, to prove their prodigious strength. He told us that, at migration time, the woodcocks in the night dashed against the glass frame wherein the lights revolved, and killed themselves; and that, in the morning, he frequently picked up several brace in the outer gallery.

Von Os. So you have at last succeeded in getting the toothwort (Lathræ'a Squamària) to grow on the roots of the hazel?

Dov. Not until I had utterly despaired. It was four years, and some five, before it came up visibly. I gathered the seeds in Erddig woods, where, you may remember, we saw it in profuse luxuriance. It will, however, turn pink or purple when very much exposed to the light, notwithstanding the remark of our learned friend, in his scientific and elaborate essay; for having cut away some of the hazel branches, to bring it more in view of the walk, the sunbeams in a few days turned it so very pinky and purple, that some ladies were very much struck with the beauty and delicacy of its colours, though the plant itself is rather of a repulsive and cadaverous aspect.

Von Os. On how many sorts of trees did you get the misseltoe to vegetate?

Dov. Twenty-three: but on most of them it soon died, particularly on the gummy and resinous; and only throve well on its usual habitats, the apple and hawthòrn.

Von Os. Did you ever see it grow well upon the oak?

Dov. Never but once; and that, singular to say, in Anglesea, in the park of (then) Lord Uxbridge: and, what is more singular, hanging almost over a very grand druidical cromlech.

Von Os. Orobánche?

Dov. Màjor: freely raised on the broom roots; but this was also four years before it appeared.

Von Os. And the dodder?

Dov. *Cúscuta?* — never; though repeatedly tried on the nettle, hemp, and flax. I once saw it in such tangled profusion at Liphook, in Sussex, that it absolutely pulled down and killed the nettles.

Von Os. Did you observe the transit of Mercury over the sun on the fifth of this month?

Dov. No; though Bloxam, I, and others amply prepared the telescopes and chronometers the day previous. We even hoisted the great one, Old Galileo, and cleaned my long Sidrophel: but, though on the very threshold of May, the "civil-suited Morn" appeared

> "Not trick'd and flounced as she was wont
> With the Attic boy to hunt;
> But kerchief'd in a comely cloud,
> While rocking winds were piping loud,

And usher'd with a shower still,
When the gust had blown its fill;
Ending on the rustling leaves,
With minute drops from off the eaves."

In plain prose, it rained all day; and, though the transit lasted seven hours, we never saw the sun once. It was that kind of rain that, I suppose, extended all over the realm; for my esteemed friend Parson Archer, in Buckinghamshire, writes me of his like disappointment.

Von Os. I should like to know *where* it was observed.

Dov. That shows the great utility of putting occasionally such chit-chat as this into the Magazine: somebody may gratify us with an answer and remarks, should they think astronomy part of natural history.

Von Os. That Córnu Ammònis in your hall is the largest I ever saw; why, it measures nearly 2 ft. in diameter. Where did it come from?

Dov. Keynsham, in Somersetshire.

Von Os. Ha! "the Well of St. Keyne."

Dov. They are there so plentiful that the roads are repaired with them; and when one is found larger or more perfect than usual, they work it into the wall of a house. As I passed on the coach between Bath and Bristol, the good-natured driver told me they were called snake-stones: for that, in *they dreadful papish times*, the land was overcrawled by serpents; and one of them having bitten the foot of St. Keyna, with her rod she turned them all into stone! He smiled incredulously when I told him they were snails — Mollúsca — probably a *N*aútilus? Of course, they are all without heads; and the simple people carve a head on the large ones, which, from necessity, is always proportionably too small; and the attempt at deception defeats itself.

Von Os. What fine large Eastern poppies! How showy they appear among the shrubs! Did you ever see those coruscations or flashes issuing from orange-coloured flowers, said to have been first observed by the daughter of Linnæus?

Dov. Yes; once from the marigold, and once from the nasturtium (Tropæ`olum màjus), at the close of a very hot day. I have no doubt they are electrical.

Von Os. There is another singular phenomenon attendant on that pungently fragrant plant the *D*ictámnus Fraxinélla. If, after a very hot day, a flame be applied near the blossom, its exhalation will blaze beautifully.

Dov. These are pleasant little notices.

Von Os. And so this is a specimen of your proposed chit-chat.

Dov. Yes; hastily and heedlessly thrown together, I must confess, the moment the thought occurred: and I will send it to the editors, with this unfeigned and earnest request, not to print it unless fully approved by them, bùt to apply it to their Fraxinélla plants. And I shall take special care not to repeat it, until I satisfactorily find it favourably received by a majority of our readers. In that case, I may vary the interlocutors, or shift the scene: either to the fields in summer; or, in winter, beside the book-room fire; assured that natural history will at all times and places spontaneously furnish multiplicity and variety of desultory CHIT-CHAT.

JOHN F. M. DOVASTON.

Westfelton, near Shrewsbury, May 29. 1832.

THE Greater Toothwort (*Lathræ`a Squàmaria* L.).—Mr. Bowman's matchless essay on this plant, replete with proofs that it is wholly a parasite, and with speculations and inferences of a high order in philosophical science, on the singularities in structure discovered by him in this plant, will be found in the *Linnæan Transactions*, vol. xvi., p. 399—420.: a faint abstract of this essay is presented in our current volume (p. 45—48.). In line 4th from the bottom of the latter page, " the *leaves* of the central root or caudex, is misprinted for " the *base* of," &c. It will scarcely be wide of the present remarks, to notice the distinctions observed in technical botany between epiphytes and parasites. Epiphytes are plants growing upon other plants, deriving from the latter nothing but their local habitation; parasites grow into, and absorb their nutriment from, the the plants which bear them: epiphytes are numerous within the tropics; parasites are few every where, and, in Britain, limited to *V*iscum álbum, *Cúscuta* europæ`a, *Cúscuta E*píthymum, Lathræ`a Squamària, the species of *O*robánche, and many species of *F*úngus; perhaps Monótropa Hypópithys, and a few other plants. Mr. Bowman, in the paper above alluded to, and in our abstract of it (p. 48.), doubts strongly if Lístera Nìdus àvis *Hooker* (*O*'phrys Nìdus àvis *Linn.*) be parasitic.

Luminous Appearance on Flowers. — In amplification of this subject, see the remarks by Mr. Green, p. 208.

The Misseltoe (V*íscum álbum* L.). — Ray, in his *Synopsis* (edition 3d, p. 464.), registers, as stocks for the misseltoe, " the oak, the hazel, the apple most frequently, pear, hawthorn, common maple, ash, lime, willow, elm, service tree, &c." What the "&c." intended is now not discoverable. At Sutton Place, Ripley, Surrey, according to the *Gardener's Magazine* (Vol. VII. p. 365.), " the *poplars* and lime trees are eaten up with misseltoe;" and the writer suggests, that as truncheons of poplar planted early in the spring root readily, the misseltoe may easily be established on any premises, by planting thereon truncheons of poplar on which the misseltoe had previously become thoroughly established. The cherry laurel (*P*rùnus Laurocérasus *Lin.*, *C*érasus Laurocérasus *Loiseleur*) will nourish the misseltoe. I saw a plant established on a laurel bush, some years ago, in the garden of the Rev. E. Simons, Ovington, Norfolk. The misseltoe does not, I believe, admit of multiplication by engrafting, but only by seeds. These are borne one in a berry, and when ripe, at Christmas time, may, by the very tenacious gum which envelopes them, or rupturing the skin of the berry by pressure, be readily and most persistently fixed into the chinks of the bark of congenial trees. The comparatively younger parts of the bark are fitter than the older and drier. Usually, neither the frosts nor rains of winter will be able to dislodge the seeds thus infixed; and in the following spring or summer they will germinate. Two moderately sized misseltoe bushes are now growing, side by side, on a young tree of the pink-flowered hawthorn, in the old botanic garden at Bury St. Edmunds, both which emanated from a single seed, sown in the above manner, on this tree, about seven years ago. It is known to botanists that the seed of the misseltoe occasionally includes two embryoes, as does the seed of the onion and of the orange; but it would seem, that of these two plants one is masculine and the other feminine; for Mr. Turner, the curator of the above garden, in the spring of this year, informed me, that one plant was abounding in berries, while the other had not a single berry on it. More accurate subsequent observation must determine whether they actually are distinct in sex; and then, if this be usually the case with most or all pairs of misseltoe plants which may spring from a single seed. Should observation affirm these to be facts, another admirable instance of comprehensive provision in nature will be manifest.

The Greater Dodder (Cúscuta *europæ`a* L.).—This parasite can be established wherever the hop plant grows, by placing, in the autumn, a wreath of the dodder vine, bearing ripe capsules, on the earth about the base of the stems of the hop plant. The seeds of the dodder, escaping from their capsules, will remain on the earth's face through the winter, and germinate early in the ensuing spring, some days ere the stems of the hop shoot forth. It will then be highly pleasing to observe the spiral convolutions of the sprouting embryoes of the dodder, evincing that vegetable instincts are innate; for even in the seed, if examined, the embryo may be found convolved about the central fleshy globose albumen. By the time the hop stems have burst through the soil, many of the embryoes of the dodder will have perished; but where the survivors happen to touch the hop stem they very soon adhere, and insert their sap-sucking glands into the bark of the hop stem; and, from the date of doing this, speedily change their pale aspect and feeble condition to a ruddy healthy hue, and a state of gross luxuriance; and these latter effects are maintained through all the copious ramifications of the plant, by the branches emitting a fresh cluster of absorbing glands into the hop stem, at many of the points at which they clasp it. Smith, in his *English Flora* (Vol. II. p. 25.), describes this species as "rare:" this can scarcely be, as in Cambridgeshire, Huntingdonshire, and Suffolk, in which I have resided, I have known of its abounding. "Thistles, nettles, flax, and other annual or biennial herbs," are, according to Smith, in the place cited, its habitats: my Huntingdonshire and Suffolk plants were on the hop: the Cambridgeshire ones were shown me when gathered; I have forgotten off what plants. Relhan's *Flora Cantabrigiensis* (edit. 2nd) states that it grows on nettles, Torìlus *A*nthríscus, the hop, and beans, and that the vernacular name for it is "hell-weed, or devil's guts," doubtless, in expression of the pertinacious bonds formed by its interlacing wreaths of countless branches. On the hop, in a garden, established as above described, I had the greater dodder to satisfaction, for three successive summers, when I left the place; and, in one of these summers, it flourished besides on an exotic species of teasel (Acæ`nops vulgàris *Schrader*), nearly allied to the British *D*ípsacus pilòsus *L.*, which had grown up beside the rubbish heap, merely from the dead seed-bearing stems of the teasel and of the dodder, along with those of the hop, having met at the rubbish heap, during the preceding winter, in the operation of clearing the garden of its annual herbage. The reddened wreaths of dodder branches, knotted with heads of flowers, were hung in elegant festoons about the arm-spread branches of the teasel, and contrasted strikingly with its abundant verdant leaves. I have known this species transplanted by cuttings, or rather by a branch broken off, into a stove, and there successfully established on a growing plant of the *Basélla* rùbra, and on some other plant whose name I have forgotten. In the green-houses at Cambridge, a very vigorously growing perennial species of dodder (of the twelve species grown in English collections, five are said to be perennial), if I rightly remember, from China, luxuriates on plants of the common and broad-leaved ivy, and on the succulent shoots of the kinds of pelargonium known by the name of the horse-shoe-leaved.

Còrnu Ammònis in Somersetshire. — On this subject, see additional remarks in p. 538. — *J. D.*

Art. II. *An Essay on the Analogy between the Structure and Functions of Vegetables and Animals.* By William Gordon, Esq., Surgeon, Welton, near Hull. Read before the Hull Literary and Philosophical Society, Nov. 19. 1830. Communicated by Mr. Gordon.

(*Continued from* p. 412.)

The next function which we have to consider is *respiration.* The blood which flows from the right cavity of the heart to the lungs is of a dark hue. It possesses many deleterious properties, and is unfit for nutrition, or any of the other functions. During its circulation through the lungs, it acquires a florid red colour, it is deprived of its noxious ingredients, and becomes adapted for all the purposes of life. Now, it has been ascertained that these changes, which take place in the nature of the blood, are effected by the agency of the atmospheric air, to which it is freely exposed as it proceeds through the lungs. The air of the atmosphere is composed of oxygen and azote. When an animal is confined in a certain quantity of it, a part of the oxygen disappears, and nearly an equivalent proportion of carbonic acid is produced in its stead. These results are caused by all animals, whether they possess a respiratory apparatus or not: oxygen is consumed, and carbonic acid is generated. Carbon, then, appears to be the material which deteriorates the blood; while oxygen is the element which purifies it. The ultimate object of respiration, then, is to bring a quantity of oxygen into contact with the venous blood, in order that it may combine with and abstract its carbon, and thus convert it into a pure and nutritious fluid. Oxygen, then, appears to be perfectly essential to life. There is no animal in the whole scale of created existence but would, if deprived of it, languish and die. Besides the evolution of carbonic acid, and the consumption of oxygen during respiration, a quantity of vapour is exhaled from the lungs, and a portion of azote is absorbed. The apparatus by which the function of respiration is carried on, is differently constructed in different animals. In man, and the higher classes, it consists of the windpipe and its ramifications, of the lungs, and of the diaphragm. The windpipe is an elastic tube, which runs down the fore-part of the neck. It divides first into two, and then into smaller branches; which at last terminate in small cells, that form the minute structure of the lungs. The lungs are organs of a light spongy texture; and composed of bloodvessels, air-cells, and cellular substance. In fishes, the organs of respiration consist of branchiæ or gills. In many of the invertebrated animals, they consist of a number of tubes called tracheæ, into which the air is constantly entering. There are numerous tribes in which no distinct respiratory apparatus can be found: in this case, the air acts on the blood through the medium of the skin.

The sap of plants, in the crude and indigested state in which it is absorbed from the soil, contains a large proportion of water; and before it is fit for the purposes of nutrition, it undergoes in its nature and properties a general change, which bears a striking resemblance to that which the blood undergoes in the lungs. If plants be exposed to the light, and particularly to the direct rays of the sun, they exhale an abundance of vapour, and likewise of oxygen gas. This watery exhalation is supplied from the sap, and the oxygen from the decomposition of carbonic acid-gas, which vegetables imbibe from the atmosphere and from the earth. As soon as they have absorbed it, it is decomposed by the light: the oxygen is set free, and the carbon is retained. Hence it appears that carbon is the proper food of plants; and thus vegetation destroys the deleterious effects arising from the respiration of animals. In the dark, however, plants, instead of exhaling, absorb oxygen. The reason of this I will explain. The sap, besides containing a quantity of carbonic acid gas, contains likewise, in solution, carbon combined with animal and vegetable matter. Before this carbon can be assimilated, it must be combined with oxygen, and converted into carbonic acid. For this purpose, then, oxygen is absorbed in the night; in the day, the carbonic acid thus formed is decomposed, the carbon is deposited, and the oxygen flies off. But, even during the day, when placed in the shade, vegetables absorb oxygen, and evaporate carbonic acid gas. Plants not only exhale moisture, but they absorb it: they likewise absorb a portion of nitrogen. All these processes are performed in the leaves; which may be considered the respiratory organs of plants. Their structure resembles that of the lungs; consisting of bloodvessels, air-tubes, and cellular tissue. If the leaves be plucked off, so that the sap cannot be properly elaborated, the growth of the plant is checked, and its fruit falls off before it is fully ripened.

The respiration of plants, although resembling that of animals, is attended with chemical results somewhat different. In the respiration of animals, oxygen disappears, and carbonic acid is produced: in that of plants, carbon is consumed, and oxygen is thrown off. If an animal be immersed in carbonic acid gas, it soon dies; but if a plant be immersed in it, it thrives vigorously, at least for a short time. Carbon is the proper food of vegetables; but if this material be allowed to accumulate in the animal system, it puts a period to its existence. It may be remarked, however, that although common air is not so favourable to the growth of vegetables as an atmosphere containing one twelfth of carbonic acid, yet, if the proportion of this gas be greater than this, it impedes the process of vegetation remarkably; and it is found that an atmosphere, one half or two thirds of whose volume consists of carbonic acid, proves destructive of vegetable life in the course of a few days. With the exception of these discrepancies, which, when closely examined, are very trifling, there is a wonderful analogy between the respiratory functions of vegetables and those of animals. In so far as regards their ultimate effect, it is particularly striking. The process to which the sap is subjected in the leaves renders this fluid fit for the continuance of all the vegetable functions, in the same manner as the process performed in the lungs changes the blood into a state proper to carry on all the vital operations of the animal system. But, beyond this, the analogy can be considerably extended. For example, we observe that plants and animals both thrive in an atmosphere composed of oxygen and nitrogen; and they both perish when deprived of it for any length of time; both, too, die in an atmosphere of pure oxygen; by means of their respiratory organs they both exhale and they both absorb moisture; both, likewise, imbibe nitrogen. Under certain circumstances all plants absorb oxygen, like animals, instead of exhaling it, and emit carbonic acid gas; and there are some parts of plants, such as the stem and branches, and also the flowers, which take in oxygen at all times, and under all circumstances, both when in the dark, and when exposed to the full rays of the sun. Oxygen, then, which is the principal agent concerned in effecting the proper change in the blood, is likewise the agent which chiefly operates upon the sap, and prepares it for being assimilated to the plant. So that it appears that oxygen is as indispensable to the existence of vegetables as to that of animals.

From what has been stated, it seems that the presence of light, as well as air, is essential to the well-being of plants. It is light that decomposes the carbonic acid gas, and thus furnishes the plant with carbon; the substance whence it derives all its colour, its solidity, and strength. If light be withdrawn, the carbonic acid gas which has been absorbed remains unaltered; the oxygen is not set free; and no deposition of carbon takes place. Hence it is that plants growing in valleys and dark situations are pale and delicate, while those which grow on mountains, and in sunny regions, are extremely hard, and of a deep green colour. For the same reason, the stem of celery, which is buried in the ground, is white, or etiolated, as it is called; while the leaves, which appear above the ground, and are exposed to the light, present a green colour. It has been found that red rose trees, if deprived of light, will produce roses almost white. All kinds of seed become more nutritious and perfect in clear than in gloomy weather; because, in the former, there is a greater intensity of light, and, consequently, a more copious deposition of carbon. Besides causing a greater assimilation of carbonaceous matter, light promotes the exhalation of vapour from the leaves: if there be a deficiency of it, the plant retains an excess of liquid, and becomes dropsical.

Animals are as dependent on light, for their growth and well-being, as vegetables are. If an animal be deprived of its influence, it becomes debilitated, unhealthy, and dropsical. The insects of southern regions, and those exposed to the light of the sun, exhibit much more brilliant colours than those which reside in northern regions, or which leave their places of concealment only during the night. The plumage of birds, and the covering of other animals, which inhabit countries near the equator, are brighter and more variegated than the vesture of those which belong to the arctic climates. When a European migrates into some equatorial country, he soon loses his fair complexion, and his skin assumes a dark colour. This change depends upon the agency of light, and the consequent deposition of carbon. The rete mucosum, or second layer of the skin, consists of oxygen, carbon, and hydrogen. The light combines with the oxygen of this substance, and sets it free; the carbon and hydrogen, the other constituents, are thus allowed to enter into new affinities, and to unite in such proportions as to form a more or less perfect carbonaceous product, which, being of a bluish grey colour, imparts to the surface its tawny complexion. An ingenious experiment of Mr. Edwards has shown that the perfect growth of animals is very dependent upon the action of light. This indefatigable and learned physiologist put some tadpoles into water contained in a reservoir, from which the light was excluded. The tadpoles grew, but did not become frogs. He afterwards removed some of them into a situation to which the light had free access. These soon lost their tail and fins, and were converted into perfect frogs: but the rest, which were kept in the dark, still continued in the state of tadpoles.

I have now endeavoured to explain the functions of absorption, of circulation, and respiration; the manner by which the chyle is taken up, and carried into the system; how it is converted in the lungs into blood; and how the blood is distributed to every part of the body. I have likewise pointed out how nearly the functions by which all these effects are produced in the animal frame, resemble those functions in the vegetable system by which the crude sap is absorbed from the earth; how it is changed in the leaves into cambium; and how the cambium is conveyed all over the plant. In the early part of my essay I remarked that every organised being is composed of solid and fluid parts. The solids consist of muscular, membranous, and nervous substance; the fluids consist of aqueous and other matter. In the animal frame, all the solid and fluid substances are produced from the blood; in plants, they are produced from the sap. Skin, fat, brain, muscle, membrane, saliva, tears, bile, and urine, are all eliminated from the blood; bark, wood, pith, pollen, oil, sugar, &c., are all eliminated from the sap. The process by which muscle is extracted from the blood, and that by which wood is extracted from the sap, are termed secretion. There are many substances existing in the blood, which, in consequence of their peculiar chemical qualities, are enabled to escape from the system by transuding through the sides of certain organs; this is considered as a species of secretion: but secretion is properly the separation of substances from the blood, which did not previously exist in this fluid. The organs by which it is performed, in the animal frame, consist of vesicles or hollow sacs. The glands, such as the liver, the pancreas, &c., are composed of a congeries of these vesicles; among which bloodvessels and excretory ducts abundantly ramify. The secreting organs of vegetables are precisely similar to those of animals. They consist of hollow bodies; and these, when collected into clusters, constitute glands, which are as abundant in the vegetable as in the animal system. Various speculations have been offered with regard to the theory of secretion. Van Helmont and Willis ascribed the process to fermentation; Hunter, Blumenbach, Bichat, and Abernethy ascribed it to the agency of the vital principle;

Descartes, Boerhaave, and Haller, to a mechanical process; Keill and Prout to chemical action; Home, Brodie, and Philip, to nervous influence. Dutrochet ascribes secretion to endosmose. Perhaps none of these hypotheses are free from objections; but that which is correct with regard to animal secretion, will be correct with regard to the secretions of vegetables.

(*To be continued.*)

ART. III. *On the supposed Pouch under the Bill of the Rook.* By CHARLES WATERTON, Esq.

> "Nec aliud quicquam . . . quæritur,
> Quàm corrigatur error ut mortalium,
> Acuatque sese diligens industria." *Phædrus.*
>
> "Nothing further is sought than to correct the errors of
> men, and to sharpen their penetration."

WE read in that faulty work, Rennie's *Montagu's Ornithological Dictionary* [p. 432.], that "the rook is furnished with a small pouch at the root of the tongue." If the carrion crow were as useful to man, as the rook is known to be; if the jay and the magpie had less to answer for, on the score of petty plunder; and if the jackdaw did not expose itself to persecution, by its prying and suspicious habits, they would all be allowed by man to range at large without molestation; and then the naturalist would have that opportunity of examining their economy, which at present is denied him.

Amongst many peculiarities in these birds, scarcely known, or even noticed, he would observe that at a certain time of the year, and only then, they all have, at intervals, an appearance of a pouch under the bill, quite as well defined as that which is seen in the rook. The idea would then occur to him, that ornithologists have either said too much, in stating that the rook is furnished with a small pouch at the root of the tongue; or too little, in not telling us that the carrion crow, the jay, the magpie, and the jackdaw are supplied with a similar convenience.

The real matter of fact is this, that naturalists err when they ascribe a pouch to the rook. Though at times there is an actual appearance of a pouch under the bill of the rook, and also under the bills of the other birds just enumerated, still, upon a close inspection, it will be seen that there is no pouch at all in any of them. The young of all birds, from the size of the thrush to that of the wren, are satisfied with a single worm at one feeding, or with two, at the most. Thus, in fields and gardens, we see an old bird catch an insect, and fly away immediately with it to the nest. But food of this scanty measure would not be enough for the larger kind of insectivorous birds. The progeny would undoubtedly require more at each feeding; and, add to this, supposing the bird only carried one insect at each turn, too much time would be lost in passing to and from the nest. To obviate this, as birds of the pie tribe have no power, in health, to eject food which has descended into the stomach (saving the indigestible remnants of aliment, which are thrown up in the form of pellets), they collect a considerable quantity of insects into their mouth, and they confine them there, without letting them go down the throat.

By this process, a rook is enabled to pick up a sufficient supply of food, some miles from the nest; and when its mouth will hold no more insects, the bird takes flight, and carries them to its expecting brood. The carrion crow, the jay, the magpie, and the jackdaw do the same thing precisely. Now, the gathered insects, being prevented from descending into the stomach, and at the same time not being able to escape at the bill, must necessarily form a lump under the lower mandible, where the skin, in all birds, is admirably formed for distention. This lump is what has given rise to the notion amongst naturalists, that the rook is furnished with a pouch at the root of the tongue. If this pouch be allowed in the rook, then it must be admitted that all birds are furnished with a pouch; and it must also be admitted that our tars are furnished with a pouch betwixt the mouth and the ear, because, for convenience' sake, they stow away their quid in that quarter.

It may be easily accounted for, why ornithologists make no mention of a pouch under the tongue of the jay, the jackdaw, the magpie, and the carrion crow, while they describe, with such plausibility a pouch at the root of the tongue of the rook. The reason is this, the rook, in general, is the friend of man, and, in the breeding season, he becomes so tame that he may be approached within a few yards. This gives you a fine opportunity of observing the lump under the bill, when the skin in that part is distended with a supply of food. Indeed, you can observe it at a considerable distance, either while the bird is on the ground, or when it is flying across you, on account of its white appearance, contrasted with the sable plumage. On the other hand, the carrion crow, the magpie, the jay, and even the jackdaw, are all birds of ruined character. Their misfortunes make them shy; and thus you are prevented from having much intercourse with them. The gardener and the henwife can never be brought to look upon them with the least appearance of kind feeling; while the gamekeeper, that cholera morbus to the feathered race, foolishly imagines that he proves his attention to his master's interests, by producing a disgusting exhibition of impaled birds on the kennel walls. Nay, show me, if you can, a young squire, idling from college, who does not try to persuade the keeper that it is his bounden duty to exterminate all manner of owls, ravens, carrion crows, hawks, herons, magpies, jays, daws, woodpeckers, ringdoves, and such like vermin, from his father's estate. With this destroying force to contend with, in the shape of keeper, squire, and henwife, it is not to be wondered at that naturalists have so few opportunities of watching individuals of the pie tribe through the entire course of their incubation; which individuals, if persecution did not exist, would be seen, in the breeding season, perpetually passing to and fro, with their mouths full of food for their young.

In my little peaceful valley, where the report of the keeper's gun is never heard, and where the birds are safe from the depredations of man, the ornithologist has free access to pursue his favourite study. Towards the middle of May, he can see here the carrion crow, the jay, the magpie, and the jackdaw, filling their mouths with grubs and worms, the weight of which forces the pliant skin under the bill into the shape of a little round ball, just of the same appearance as that which is observed in the rook, with this trifling difference, that the lump is feathered in the first, and bare of feathers in the last.

While I am writing this, there may be seen here a wild duck hatching her eggs in a nest upon a sloping wooded bank; while a carrion crow is hatching hers in a fir tree ten yards from the spot, and a windhover hawk is performing the same function in a fir tree about six yards on the other side of the duck. Forty yards from where the carrion crow is hatching, may be seen a barn owl sitting on her eggs in the hollow of an oak tree; and, at twenty yards' distance from the windhover, another white or barn owl has formed her nest in the decayed recesses of a tremendous oak. Though all these families keep the peace, I do not wish it to be understood that they are upon visiting terms. In another part, a long-eared owl is rearing her young in the last year's nest of a carrion crow. When the parent bird is asleep, you can see very distinctly the erect feathers on the head: but the moment she gets a sight of you, down go the erect feathers, and lie close to the head; so that an inexperienced observer might take the bird to be a tawny owl. This year, a wild duck has chosen her place of incubation twelve feet from the ground, in an oak tree, near the water; while, in the immediate vicinity, several magpies are hatching in undisturbed repose.

I am sometimes questioned by country gentlemen (who have a keen eye for jugged hare and roasted partridges) on the propriety of befriending, what they consider, feathered vermin. I tell them that Professor Rennie has remarked, in this Magazine (Vol. V. p. 102.), " that I have hitherto published nothing, respecting the economy or faculties of animals, of the least use to natural history." This being the case, I am trying to make up my deficiency in pen and ink, by establishing a sylvan enclosure, which any ornithologist is allowed to enter; and where he will have an opportunity of correcting, by actual observation, some of those errors which appear in the second edition of *Montagu*, by James Rennie, A.M. A.L.S. Moreover, sometimes, in a jocose kind of a way, I tell them I like to have all kinds of birds around me; and that I cannot find in my heart to kill a poor jay for sucking an egg, when I know

" That I myself, carnivorous sinner,
Had pullets yesterday for dinner."

Walton Hall, May 9. 1832. CHARLES WATERTON.

ART. IV. *On the Preservation of Egg-shells for Cabinets of Natural History.* By CHARLES WATERTON, Esq.

" Si sumas ovum, molle sit, atque novum." *Schola Salernitana.*
" If you take an egg, let it be soft and new."

I HAVE been blundering at this work for some years; " seeking for something I could not find," and always dissatisfied with myself on account of the failure. The object of my search was, to try to find out how I could properly dispose of the thin white membrane next the shell of the egg. When left in, it is apt to corrupt; in which case, the colour of the shell will sometimes fade, and an offensive smell is produced, which a lapse of years will not subdue. Last spring, I thought I had succeeded; but it turned out to be a very partial success. I, first, by blowing, discharged the contents of five swans' eggs, and then immersed the shells in a tub of water for a month. This enabled me to pull out the thin membrane, by means of a piece of wire bent at the end. But I found that the colour of the shell had faded considerably. Moreover, the process required too much time; and I saw that there would be great difficulty in doing small eggs.

About three weeks ago, a bright thought (a *rara avis* with me) struck me, just as I was in the act of climbing up to a hawk's nest. I felt certain that every difficulty had vanished, and I began to blame myself on the score of former dulness.

In selecting eggs for your cabinet, always choose those which are newly laid. Make a moderately-sized hole at the sharp end, with a pointed instrument proportioned to the egg. Thus, for a swan's egg, use the point of your penknife; for a robin's, take a small pin. Having made the hole at the sharp end, make one at the blunt end; and let this last hole be as small as possible. This done, apply your mouth to the blunt end, and blow the contents of the egg through the sharp end, where the hole is larger. If the yolk will not come out freely, run a pin or a wire up into the egg, and stir the yolk well about. Now get a cupful of water, and, immersing the sharp end of the shell into it, apply your mouth to the blunt end, and suck up some of the water into the empty shell. Then put your finger and thumb upon the two holes, shake the water well within, and, after this, blow it out. The water will clear your egg of any remains of yolk or of white which might stay in after the blowing. If one sucking up of water will not suffice, make a second or a third.

An egg, immediately after it is produced, is very clean and pure; but by staying in the nest, and by coming in contact with the feet of the bird, it soon assumes a soiled appearance. To remedy this, wash it well in soap and water; and use a nail-brush to get the dirt off. Your egg-shell is now as it ought to be; and nothing remains to be done but to prevent the thin white membrane (which is still inside) from corrupting.

Take a wine-glass, and fill it with the solution of corrosive sublimate in alcohol. Then immerse the sharp end of the egg-shell into it, keeping your finger and thumb, as you hold it, just clear of the solution. Apply your mouth to the little hole at the blunt end, and suck up some of the solution into the shell. You need not be fearful of getting the liquor into your mouth; for, as soon as it rises in the shell, the cold will strike your finger and thumb, and then you cease sucking. Shake the shell just as you did when the water was in it, and then blow the solution back into the glass. Your egg-shell is now beyond the reach of corruption; the membrane retains for ever its pristine whiteness; and no insect, for the time to come, will ever venture to prey upon it. If you wish your egg to appear extremely brilliant, give it a coat of mastic varnish, put on very sparingly with a camel-hair pencil. Green or blue eggs must be done with gum arabic, because the mastic varnish is apt to injure the colour.

This is all. How dull I have been, not to have found out this simple process long ago! I have used the solution to preserve skins, furs, and feathers from putrefaction and the moth, for nearly twenty years; still the idea never struck me, till three weeks ago, that it could be so serviceable in preventing all tendency to putrefaction in the membrane of the shell, which had given me so much trouble, and caused so many useless experiments. I trust that the kind-hearted naturalist will not turn this little process of preparing eggs into affliction to poor birds. One egg out of each nest (with a few exceptions) will not be missed by the owner; but to take them all away would be hard indeed. Such an act would make the parent bird as sad and sorrowful as Niobe. You know Niobe's story: Apollo slew her every child. I beg to present this new mode of preparing egg-shells to Mr. Loudon, for his delightful Magazine of Natural History.

CHARLES WATERTON.

Walton Hall, May 11. 1832.

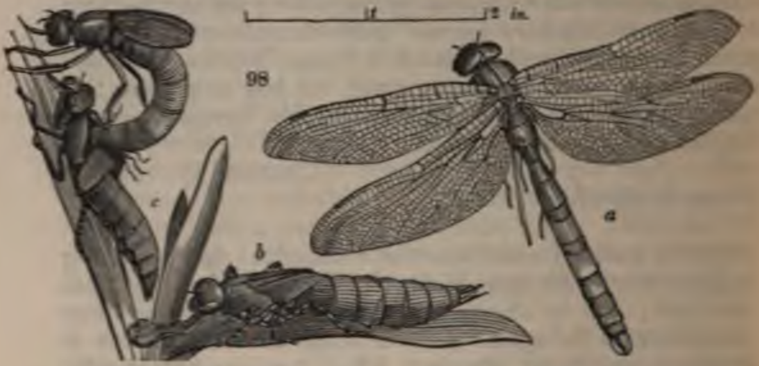
P. S. — Since I sent you the instructions for preparing eggs, my friend, George Walker of Killingbeck Lodge, has been here; and he thinks that copal varnish is better than mastic varnish for eggs. I have made an improvement in blowing larger kinds of eggs. I find that one hole is sufficient. When that hole is made, introduce a straight wire, with a little piece of dry cotton or thread well tied round the end introduced. Then, holding the egg with the hole downwards, you use the wire, which acts as a piston, and forces a sufficient quantity of the contents of the egg out, to enable you to get out the rest by sudden jerks. This is a much longer process than blowing; but you have the advantage of having only one hole in your egg, instead of two. — *Charles Waterton. June* 12. 1832.

THE figure and description of a pipe for blowing eggs (given in Vol. IV. p. 145.) have possibly not yet met the eye of Mr. Waterton. Will not that instrument be found to increase the despatch and convenience with which the yolk and white of an egg may be drawn from the shell? — *J. D.*

ART. V. *Brief Notices of the Habits and Transformations of the Dragon Fly; compiled in explanation of the accompanying Cut.* By J. D.

MR. NEWMAN, in his essay entitled *Sphinx vespifórmis*, has accorded to the dragon fly family a high degree in the relative scale of insect importance. "Their imperial flight, their enormous size, their richly variegated colours, their despotic and cruel habits," he remarks, "justly entitle them to rank "as emperors of the insect world." Interesting as they may be on these accounts, they are likewise so on account of the structure of their jaws when in the larva state, and from the obvious example they supply of the interesting process of transformation.

Fig. 98. represents this process; and, although the same may be duly familiar to experienced entomologists, the cut, it is presumed, will be welcome to junior students in entomology. Many who are familiar with dragon flies, as seen in the end of summer (*a*), when vigorous in wing and arrow-like in speed of flight (hence called, not ineptly, "hobby-horses," by children in the fens of Cambridgeshire), will, perhaps, scarcely credit the fact that these emperors of the insect world emanate from a repulsive-looking voracious grub (*b*), that, until it changes to the winged state, lives wholly in the water, and subsists there on insects and other small animals. This is, nevertheless, the fact; and on the surface of still and slowly flowing waters, the empty pupa cases (*c*) may be found floating in July and August: in the ditches and drains of the fens of Cambridgeshire they are at this time frequently visible. The first live larva of the dragon fly I ever witnessed was while bathing, some years ago, in the river Lark, near Bury St. Edmunds, Suffolk. I then knew not what it was; but disliked its appearance, from the strong similarity it bore to the land insect Goèrius òlens, whose torturing and predaceous habits I knew. The similarity in form, and greater size, instantly suggested the idea that it was probably not less predaceous: subsequent research and experience have proved this opinion accurate. The student, by turning to Kirby and Spence's *Introduction*, vol. i. p. 272., and vol. iii. p. 126., will find superlative voracity



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ascribed to the dragon flies in their every state, larva, pupa, and imago. In proof of this, in their larva or pupa state, I have one instance to relate; and this instance will also corroborate the remark quoted by Kirby and Spence from De Geer, viz.: — "De Geer says it is very difficult for other insects to elude their attacks; and that he has even seen them devour very small fishes." While walking one day, in the spring of 1829, round the aquarium in the Cambridge Botanic Garden, examining the aquatic plants there, in company with Mr. Biggs, the curator of the garden, and a third person, our attention was arrested by a circular movement in the water. On looking to it, we instantly perceived that a pretty strong larva of a dragon fly had captured a stickleback, and that the mutual struggles of the two produced the gyratory motion mentioned. This continued for some little time, and within about 6 in. of the surface of the water. As the fish became exhausted, both began to descend in a spiral manner; and the scene ended with us in the fish being laid on its side on the mud at the bottom, and the larva of the dragon fly still retaining its hold.

In the annexed cut (*fig.* 98.), in the pupa (marked *b*), a peculiar appendage to the head will be perceived: this and its uses will be best explained by a quotation from Kirby and Spence's *Introd.*, from the pages above indicated, whither the reader is referred for a more detailed technical explanation than space will allow to be given here. The larvæ and pupæ of dragon flies "are furnished with two pair of strong jaws, covered by a kind of mask, armed with a pair of forceps or claws, which the animal has the power of pushing from it to catch any thing at a distance. While the animal is at rest, this mask applies to and covers the face; but, when it would make use of it, it unfolds the mask like an arm, catches the prey at which it aims by means of the mandibuliform plates, and then partly refolds the mask, so as to hold the prey to the mouth in a convenient position for the operation of its two pair of jaws. Reaumur once found one of them thus holding and devouring a large tadpole."

In the same work, also, it is remarked (vol. iii. p. 117.): — "In the larvæ of the dragon flies (Libéllula *L.*), and other Neurόptera, the eyes are composed of many facets [was "as many facets" meant to be said?] as in those of the perfect insect, from which they differ chiefly in being smaller." The remarks and diagrams by Mr. Parsons, on the eyes of the common or grey dragon fly, given in Vol. IV. p. 221—224. of this Magazine, may be profitably studied in connection with the present article.

A remark may be here ventured on the sexual differences in the more common species of dragon fly in the imago state. In *Kirby and Spence*, vol. iii. p. 300., it is remarked, on the authority of Reaumur: — "In the Neuróptera, the female Libellùlidæ are sometimes sensibly smaller, and never larger, than their males." This may be true; but the remarkable abdominal difference in the sexes ought not to escape observation, the figure of this part in the male being long and slender, as in *fig.* 98. *a*; and in the female shorter, broader, and more gross, bearing much resemblance to the figure of the abdomen in the pupa (marked *b*). It may, besides, be asked (for I find it not stated), what time is occupied by the dragon fly, in passing through the larva and pupa states into the imago? As the Libéllulæ are deemed highly developed insects, is it irrational to suppose they may occupy almost as long a time in the larva and pupa states as Melolóntha vulgàris and Cóssus ligniperda are stated to do?

Samouelle's remarks (*Compendium*, p. 65.) on the dragon fly family are so pertinent, succinct, and yet explicit, that I must quote them also. The dragon flies "are remarkable for a long slender body, and wings standing out at right angles. The larvæ have six feet, and move with great activity in the water: . . . they are the crocodiles of aquatic insects. The larvæ and pupæ are not very different; the latter (*b c*) have the rudiments of wings. In a fine day in June, a person standing by a pond may observe them approach the bank, for the purpose of changing their element. Having crawled up a blade of grass or bit of dry wood [usually the withered stems and leaves of last year's herbage], the skin of the pupa grows parched, and splits at the upper part of the thorax (*c*). The insect issues forth gradually, throws off its slough, in a few minutes expands its wings, flutters, and then flies off. The sexual parts in the male are placed under the thorax; in the female, at the extremity of the body. The tail of the male is furnished with a hooked forceps."

Art. VI. *Illustrations in British Zoology.* By George Johnston, M.D., Fellow of the Royal College of Surgeons of Edinburgh.

5. Prani`za fusca`ta. (*fig.* 99.)

Cl. Crustàcea, Ord. Heterobránchia, Fam. Ionéllidæ, Gen. Praniza.

This genus was proposed by Dr. Leach, a naturalist of extraordinary zeal and acquirements, for a remarkable crus-

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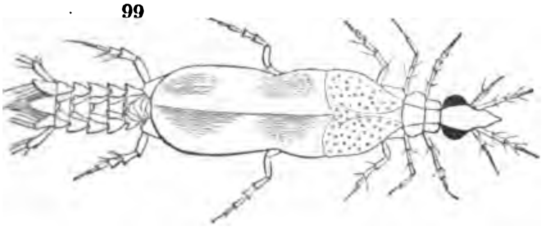

taceous insect which Montagu had discovered on the shores of Devon, and described as a species of Oníscus. It is yet, so far as I know, the only member of its genus recognised in systematic works; and, I think, there are among your readers some who will be gratified by having another native one brought under their notice.

The Pranìzæ are marine crustacea of minute size. By means of their legs, they can creep on the bottom, which they do slowly; but they swim with greater rapidity, propelling themselves forwards by the quick motions of a series of ciliated fins placed beneath the tail. Of their economy, nothing is known. They are characterised by having four unequal antennæ; two sessile eyes; an elongated body divided into three segments, of which the two anterior, or thoracic, are very small, and the third, or abdominal, very large. They have ten legs, a pair to each segment of the thorax, and three pairs to the abdomen; while the jointed tail is armed beneath, and at its end, with foliaceous appendages, that appear to be both motive and respiratory organs.

The species may be distinguished thus: —

1. P. cæruleàta. — Abdominal segment blue (*Lamarck*, *Hist. Nat.*, vol. v. p. 168.). Oníscus cæruleàtus (*Montagu*, in *Lin. Trans.*, vol. xi. p. 15. tab. iv. fig. 2.). — *Hab.* Shores of Devon.
2. P. fuscàta — Abdominal segment reddish brown [*Johnston*, in *Magazine of Natural History*, Vol. V. p. 521.]. — *Hab.* Coast of Berwickshire.

The latter is two lines long, subcylindrical. The head, thorax, tail, and legs colourless and transparent; eyes black; the great segment of a reddish brown. Head pointed. Antennæ lateral, four-jointed, the ultimate joint long, and divided by many transverse lines. Eyes lateral, large, compound like those of insects. Thoracic segments very small, with a pair of legs to each: abdomen ovate, with a translucent edge, furnished with three pairs of legs; one from the anterior margin, one from the middle, and one from a projecting tubercle at the base. Legs taper, five-jointed, armed with a simple nearly straight claw. Tail straight, five-jointed; joints equal, distinct, armed on the under side with four rows of compressed fins ciliated on the margins; and the ultimate joint terminated, besides, with four similar appendages, and a triangular process between them.

The large segment is, in some specimens, smooth and even; but in others, one of which was selected for our figure, it is raised at the top into two oval bosses that greatly resemble the elytra of a Méloe, and are beautifully punctured. The same parts are visible on the ventral surface in *both* varieties, but much smaller in that whose back is smooth. It may be a sexual distinction.

George Johnston, M.D.

Berwick upon Tweed, April 18. 1832.

Art. VII. *On the Dispersion and Distribution of Plants.*

By J. E. L.

If we take a general view of the surface and covering of the earth, we shall meet with a perpetual series of flowery valleys, mountains rich in alpine verdure, and forests smiling with the bright and luxuriant tints of the tropics; or sternly resisting, with their dark and sombre foliage, the frozen winds that career over the desolate plains of the north. Wherever we turn, we every where see the same mantle of green spread over the earth; and, even in the most distant lands, our eyes are cheered by that enlivening verdure which adds such a nameless charm to every rural scene. The same wild profusion reigns, and nature teems with never-failing abundance.

> " Thus spring the living herbs, profusely wild,
> O'er all the deep-green earth;
> With such a liberal hand has Nature flung
> Their seeds abroad." *Thomson.*

But was the scene always so fair? was there always the same display of vegetable riches? or was there a time when the earth was a desolate and barren wilderness, a mass of craggy precipices, rocks piled on rocks, without any trace of organic life?

> ——— " Where eldest Night,
> And Chaos, ancestors of Nature, held
> Eternal anarchy, amidst the noise
> Of endless waves, and by confusion stood."

This, doubtless, was the state of our globe, for ages before the earth was sufficiently modified to admit of the existence of vegetables. With their original creation we have not at present to do: it is our object, in this paper, to discuss the manner in which vegetables were dispersed over the world; whether by progressive steps from one point, or by one contemporaneous dispersion, spread over the face of the earth.

The first of these suppositions will be hardly tenable, if it be fully examined, and the arguments by which it is supported be thoroughly canvassed. The supporters of this theory assert, that, since we are expressly informed that the different animals were dispersed from one original station at the time of the expulsion of our first parents from paradise, that from the same original locality vegetables in like manner emigrated. Now, this appears not only incredible, but perfectly inconsistent with divine beneficence and the Mosaic history. When our first parents were doomed to wander exiles from the happy scenes of their primeval residence, would the Almighty have compelled them to wander over a barren and desolate wilderness? How were they to have obtained the necessary subsistence, if the earth had been a naked rock? They would, beyond a doubt, have perished miserably. There are many theories and hypotheses respecting the land which was then uncovered by the waters of the ocean; some asserting that but a very small portion was left bare. With these visionary dreamings we have no concern: we must be understood to assert that the creation of vegetables was antecedent to that of animals; and that, wherever the land was not covered by the sea, there was to be found abundance of earth's vegetable treasures. Even supposing that the grand dispersion was coeval with the expulsion of our first progenitor, this theory will gain no advantage. The earth, we are well aware, must needs have suffered many important changes before it could support vegetable life; and daily experience proves this change to have been gradual. It is much more reasonable to suppose, that, long previous to the creation of mankind, or even of the lower animals, the earth had, by the store of food universally extended, become adapted to their support. But how does the Mosaic history bear with reference to this? "And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind, whose seed is in itself, upon the earth: and it was so." "And the evening and the morning were the third day." (*Genesis*, chap. i. ver. 11. and 13.) Here we are told that the earth became covered with grass and herbs of various kinds, without any specification of time or place. Now, the word day, in this passage, appears to signify a certain period or length of time; that is to say, the third period from the creation of the earth: viz., first, the vicissitudes of day and night, since, without light, nothing possessed of life can come to perfection;

secondly, the land was separated from the water; then, when it had acquired sufficient consistency, vegetables were scattered over it, which afforded food for animals, the creation of which followed; and lastly came man, to take possession of the whole. Now, what argument do we derive from this? That the earth went through progressive stages, the duration of which we have no means of determining; and was adapted to the existence of man before he himself appeared. Hitherto we have considered the subject in a scriptural and rational point of view: let us now apply botanical reasoning. Supposing it possible that vegetables could have been dispersed originally from one station, and thence become naturalised over the whole world, how would this theory agree with the present state of our knowledge? Were we at this time to find that plants flourished equally well in all countries, unaffected by the changes of heat and cold, climate, and geological structure of the earth; or that the same plants were universally distributed, peculiar to no part of the world, but equally common in all; then we might reasonably and naturally infer that they are citizens of no country, but of the world in general. But how stands the fact? If we cast our eyes over a botanical chart, we shall find that, far from this being the case, many families of plants are peculiar to certain parts of the world, and never extend naturally beyond these boundaries; that some are exclusively confined to one small tract, while others are scattered equally over the face of the earth. Thus, for instance, the *Anonàceæ*, Dilleni*àceæ*, and the palms are almost entirely confined to tropical countries. The *Erìcæ* are scarcely to be met with out of the Cape of Good Hope: not a single species is found in America or in Asia; and few, comparatively speaking, are natives of Europe. Lastly, New Holland presents a rich and inexhaustible field of discovery. The botany of Australia is so dissimilar to that of every other known country, that it deserves particular attention. Of the plants already known in that country, 400 species are cryptogamic, 860 monocotyledonous, and 2900 dicotyledonous. Of the 400 cryptogamic, more than 120 are also indigenous to Europe; of the 860 monocotyledonous, only 30 have been found in Europe, and more than half of these are grasses and Cyper*àceæ*; but of the 2900 dicotyledonous species, only 15 are the same in Australia as in Europe. (*Library of Useful Knowledge*, Physical Geography, part ii.) They exhibit but a very meagre acquaintance with the laws which influence the situation and locality of plants, who conceive it possible (though it is a well known fact that plants are very far from indifferent to the changes of heat and cold, and the composition and nature of the soil on which they are found) that they could be assembled originally in one station; or that one single part of the world could afford varieties of climate, soil, and situation sufficient for the support of plants which now are found in the most opposite regions of the earth. It is physically impossible that the same vegetable productions should be found on the sandy downs of New Holland, or in the forests of North America, and on the granitic peaks of the Himalayah chain. However strange this theory may appear, nevertheless it is but just to mention that it was the opinion of the founder of scientific botany. Linnæus very ingeniously, though, in my opinion, unconvincingly, endeavours to prove that plants were originally dispersed from one locality. In maintenance of this theory, he supposes the primary seat of plants to have been in a warm climate (Armenia or Thibet), comprehending a lofty mountain range, on which the plants of different regions were congregated, and from thence spread over the world. (*Oratio de Telluris habitabilis Incremento.*) If such were the case, we might expect, in the regions in the heart of Asia, to find traces of the vegetable productions of America, New Holland, or Southern Africa; since from the mountain ridge, and the circumjacent plains of Asia, according to this supposition, they originally migrated. It is much more rational to suppose that the creation of them was universal, modified and regulated to suit the character of the soil, composition of the rocks, and temperature of the climate, in which they were intended to multiply. To assist their dispersion, he calls in the aid of winds, rivers, birds, &c.; and makes mention of many curious contrivances in the vegetable structure to enable them to project their seeds to a distance: and supposes, since the seeds of cryptogamous plants are so minute, that they would be conveyed by the agency of the winds to an incalculable distance. To this theory some strong objections may be offered: — 1st, That vegetables could not be dispersed, without a soil calculated to receive and nourish the seeds; 2d, Though the winds are undoubtedly able to convey the seeds of many plants to a great distance, especially those of the class Syngenèsia and natural order Compósitæ, yet of many others they cannot effect the dispersion for even a single mile. I have myself seen, in this county (Yorkshire), a bank covered with the Aquilègia vulgàris, which, though exposed to the most violent action of the winds, never spread over the neighbouring fields. This opinion we cannot, therefore, reasonably admit as the true one: the progressive steps by which vegetation advances are extremely slow; and it requires the lapse of ages to transform a barren rock into a state fit to support man, and to supply his numerous wants.

The remains of vegetables belonging to an antediluvian world are found in the slate formation, and consist principally of ferns, palms, grasses, reeds, &c.; but these forms, though they cannot be referred to any known species of plants, yet have so much the appearance of tropical productions, that we must admit the existence of a much greater heat at the surface of the earth than at the present day; and this heat must have been distributed over all the zones, since these forms are found to exist in slate formations in all parts of the earth. (*Philosophy of Plants*, p. 276., by Decandolle and Sprengel.) Whether, as was the opinion of Linnæus, only one species in each genus was originally created, we cannot positively prove or deny.

We will now proceed to a part of our subject well worthy of the most earnest attention, as in no other branch of nature is the Divine Providence more plainly seen; namely, *the progress of vegetation*. Mosses and lichens (at least in the temperate zones) first fix their insinuating fibres in the crevices of the rocks; and as these die, and are again reproduced, a light vegetable soil is deposited, which in time becomes of sufficient depth to support grasses and other herbaceous plants: and at length, in the course of ages, the desert rock becomes a verdant meadow. The fruit of some tree is cast up by the waves, or dropped by birds: thus forests are gradually produced, till the island becomes fitted for the residence of man, who along with him introduces his domestic animals: and thus the once naked rock becomes a thriving colony. In the northern part of the temperate zones, as we have before observed, the cryptogamic plants are the first that cover the stony crust of the globe; the lichens and mosses, that display their foliage beneath the snows, are succeeded by grasses and other phanerogamous plants. This is the order of vegetation in the northern and temperate zones; but when we advance to the torrid zone, and between the tropics, the progressive stages are different. (Humboldt's *Personal Narrative*, vol. i. p. 262.) We there find, it is true, whatever some travellers may have asserted to the contrary, not only in the mountains, but also in the humid and shady places, almost on a level with the ocean, Funària, Dícranum, and *Brỳum*; and these genera among their numerous species exhibit several which are common to Lapland, the Peak of Teneriffe, and the Blue Mountains of Jamaica. Nevertheless, in general, it is not by mosses and lichens that vegetation in countries near the tropics begins. In the Canary Islands, as well as in Guiana, and on the rocky coasts of Peru, the first vegetables that prepare the mould for others are the succulent plants; the leaves of which, provided with an infinite number of orifices and cutaneous vessels, deprive the ambient air of the water which it holds in solution [see *Gard. Mag.*, vol. viii. p. 234.]: fixed in the crevices of volcanic rocks, they form, as it were, the first layer of vegetable earth with which the currents of lithoid lava are clothed. Wherever these lavas are scorified, and where they have a shining surface, as in the basaltic mounds to the north of Lanzerota, the unfolding of vegetation is extremely slow, and many ages may roll away before shrubs can take root. It is only when lavas are covered with tufa and ashes, the volcanic islands lose that appearance of nudity which marks their origin, and deck themselves with a brilliant vegetation.

In the Southern Pacific, the unceasing labours of the minute zoophytes are continually raising the banks of coral above the level of the sea: and here we see displayed the progressive increase of vegetation, and the surprising manner in which, as soon as the coral ridge emerges beyond the washing of the spring tides, it becomes clothed with vegetables, and at length adapted to the residence of man. The coral worms, which, by their astonishing labours, raise up islands from the waves, are of various shapes; the common form is that of a star. They are furnished with arms 4 in. or 6 in. long, which they are continually moving up and down, probably in search of food. They can only proceed with their labours while the tide washes over them, and cannot raise the reef beyond low water mark; but the fragments of rock, sand, coral, &c., adhere to the rock, and form a solid mass with it, as high as the common tides reach. That elevation surpassed, the future remnants, being rarely covered, lose their adhesive property, and, remaining in a loose state, form what is usually called a key upon the top of the reef. The new bank is not long in being visited by sea-birds; salt-loving plants take root upon it; and a soil begins to be formed: a cocoa nut, or the drupe of a *Pandànus* [screw pine] is thrown on shore; land birds visit it*, and deposit the seeds of shrubs and trees; every high tide, and, still more, every gale, adds something to the bank; the form of an island is gradually assumed; and last of all comes man, to take possession. These various steps are distinctly marked in an island situated on the north coast of New Holland. Half-way Island is well advanced in the above progressive state; having been many years, probably some ages, above the reach of the highest tides, or the wash of the surf in the heaviest gales. "I [Captain Flinders] distinguished, however, in the rock which forms its basis, the sand, coral, and shells formerly thrown up, in more or less perfect state of cohesion. Small pieces of wood, pumice-stone, and other extraneous bodies which chance had mixed with the calcareous substances when the cohesion began, were enclosed in the rock, and in some cases were still separable from it without much force. The upper part of the island is a mixture of the same substances in a loose state, with a little vegetable soil; and is covered with the Casuarìna, and a variety of other trees and shrubs, which give food to the parroquets, pigeons, and some other birds, to whose ancestors, it is probable, the island was originally indebted for this vegetation." (Flinders's *Survey of the Coast of New Holland.*) From the progress which this island has made, from natural causes, in its vegetation, it is beyond a doubt that the winds and waves are very efficient agents in spreading abroad the seeds of plants (though, at the same time that we allow this, we must not pass by unnoticed the length of time which the slow advance of vegetation, when thus aided, requires), as has certainly been the case with some species now spread over the whole of Europe, but once entire strangers to its inhabitants. Thus, the *E*rígeron canadénsis (an instance which Linnæus cites in confirmation of his theory,) was first introduced into the gardens near Paris, from Canada; and then, the seeds being carried by the winds, soon spread over all France, Italy, Sicily, Belgium, and Germany: but this is a solitary

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* ***Dissemination of Plants by Birds.***—In 1824, Robert Hurnard, a Quaker gentleman, and two of his sons, visited England, from the State of Delaware, in North America, and brought with them seeds of some of the trees, shrubs, and herbaceous plants native to, or cultivated in, that State. Mr. Hurnard and sons visited some friends at Bury St. Edmunds; and, while there, inspected the botanic garden of that town; and shortly afterwards, through the hands of their friend, and, I believe, relative, Mr. Samuel Fennell, a subscriber to the garden, they imparted to it a portion of these seeds. Amongst them was a packet, inscribed "Wildgoose beans. The seeds from which the enclosed were raised were found in the stomach of a wildgoose which was shot about 300 miles from land, two years since." The beans were kidneybeans; and, on being sown, developed plants, to

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the best of my recollection, without twining stems, and much resembling *P*hasèolus vulgàris in some one of its variations. This fact shows that birds may become the agents of a very diffusive dispersion of plants; for, although it must be at once admitted, that, under natural circumstances, these particular kidneybeans would have been consumed by the digestive powers of the goose, it is not less true that seeds of an indigestible texture, and those encased in stony coverings, as in stone fruit, and very minute seeds, which, in some cases, are numerously embedded in the copious pulp of certain berries, can and do pass through the bodies of animals without any diminution of their powers of germination. Very numerous facts may be collected to prove this position, were not its truth already so familiar to many, as to render a collection of proofs unnecessary.—*J. D.*

instance. In like manner, borne along by the currents, fruits and seeds belonging to the West Indian islands are cast upon the Hebrides and the coast of Norway, during storms from the south-west, as cocoa nuts, gourds, the fruit of *Acàcia* scándens, Piscídia Erythrìna, and Anacárdium occidentàle. But these examples, though affording a slight argument, are far from proving that the whole vegetable world was thus dispersed.

By our commercial relations with distant countries, we have received many foreign productions: thus the peach, nectarine, cherry, vine, and almost all our fruits, are exotic, the greater part being original natives of Armenia and the most central parts of Asia. The cherry, we are told by Pliny, was first brought into Italy by Lucullus, after his victory over Mithridates, from Pontus; and, 120 years after, was known in Britain. (Pliny, *Nat. Hist.*, b. iv. c. 21.) The same author also relates that quinces were brought originally from Crete, and walnuts from Asia Minor. Even the different species of grain, which constitute one of the chief sources of our wealth, are original natives of central Asia. Bruce supposed that Abyssinia was the native country of the oat, from their luxuriance and size in that country; being equal in height to a man, and the stalks near an inch in diameter. (Head's *Life of Bruce.*)

I will now mention a second hypothesis, which has been thought sufficient to account for the universal dispersion of plants: that they originated from primitive centres situated in different parts of the world, and embracing different species, which, by continued progression, became blended, and no longer peculiar to their original locality. But neither is this theory unexceptionable. The causes which influence the distribution of plants are so complicated, that it is difficult to offer a probable opinion upon the subject. We often find in most distant countries similar species, whilst the floras of adjoining provinces are frequently altogether dissimilar. It is obvious that their position depends upon the peculiar nature of the soil: thus, wherever salt marshes are found, alkaline plants, the chenopodiums, salsolas, atriplexes, salicornias, &c., are almost certain to occur. Mountains exercise great influence over the distribution of vegetables: we find the same, or similar, productions upon mountains of the same geological structure, though separated by half the globe. By this assertion, I, of course, must be understood to mean at the same (or nearly so) altitude above the level of the sea; or, perhaps, more correctly, below the snow line, combined with climate and atmospheric temperature. Thus, upon the chain of the Andes, in South America, we find, at a certain height, vegetables corresponding to the natives of the temperate and even the frigid zones. But there is a peculiar circumstance respecting these plants which we must not overlook. It is a remarkable fact, that though Humboldt found upon the abovementioned mountains individuals resembling others native to the temperate zones, yet, though in general the same, they were almost in every case specifically different. Thus they possess, says Humboldt, certainly, plantains, valerians, arenarias, ranunculuses, medlars, oaks, and pines, which, from their physiology, we might confound with those of Europe; but they are all perfectly distinct. The antarctic birch (*B*étula antárctica) resembles, but is not identically the same with, the *B*étula nàna of northern regions. Upon this subject we shall speak more fully when we come to treat of the geography of plants. It has been asserted by Mr. Brown to be generally true, that the native country of a genus is where the greatest number of its species is found. This, though correct in some peculiar cases, can hardly be allowed to hold universally. For instance, by far the greatest number of our heaths (*E*rìcæ) are met with near the Cape of Good Hope; yet the ling (Callùna vulgàris), and the *E*rìca *T*étralix and cinèrea of our moors, cannot surely be denied as indigenous to the north of Europe. We are ready to admit the migration of plants to a certain extent, and from various causes: thus, the floras of islands generally exemplify this fact. * The different groups seated in the great Southern Ocean, which lies between America and Eastern Asia, serve as instances in point: the easternmost islands contain more plants of American families or species; and the western, of those tribes peculiar to the Indian islands: placed in the neighbourhood of two continents, they comprise the vegetation of both. Malta and Sicily have plants which belong to Europe, and others of an African stock. The vegetation of the Cape de Verd Islands is intermediate between the floras of the Canary Islands and of the African coast. (*Phys. Geography*, part ii. p. 49.) On the contrary to this, there are some spots producing species quite peculiar: thus, in Kerguelen Island, which was visited by Captain Cook, the number of species was found not to exceed sixteen or eighteen, and these were all considered quite *sui generis* [of peculiar kind]. On inland stations, we sometimes find plants confined to a certain district, and not extending beyond its limits. Such is the far-famed and ancient Cedar of Lebanon, the glory of the forest,

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* "On the shores of the Marianne Islands, fruits and seeds of many trees were observed; the greater part not indigenous, but wafted from remote stations by the sea. The greater number of these seeds belong to the arborescent or the climbing leguminous plants, which grow plentifully every where between the tropics. Those of the Guilandìna *Bónduc* are very common among them; but we only saw the plant itself once, on one of the Leeward Islands." (Translation, in part ii. of Hooker's *Botanical Miscellany*, of Chamisso's notices respecting the botany of certain countries visited by the Russian voyage of discovery under the command of Captain Kotzebue.) — *J. D.*

> "Towering unknown beyond its native rocks."

The idea that plants are, or were ever, confined to one locality, has been by none more strongly opposed than by our immortal naturalist, John Ray. He says, in his essay upon the number of plants, which is well worthy of perusal, arguing against the possibility of any species being lost (Ray's *Letters*, p. 350.): — "Though some species should be destroyed, yet it is impossible, morally, that any man should be sure thereof. First, I say that it is highly improbable; because that I can hardly persuade myself that there is any one local species of plants in the world: I mean, so proper and peculiar to one individual place as not to be found elsewhere. I am induced so to think, because I have not observed in England any one plant so proper to one place, but that I have found the same either beyond sea, or, at least, in several places of this island: and I doubt not but whatever grows naturally here may be found in divers places, of the same latitude or temper, beyond the seas. I am not ignorant that herbalists make sundry proper and particular to some one place: as, for example, the balsam to Judea, &c.; but from these I must crave leave to dissent, till they have more than any negative argument to prove what they affirm. Yet, supposing there be such local plants (unless you place them in islands that shall be wholly overwhelmed and swallowed up by the sea), though they were at present extirpated by the hand of man, or any accident, yet the seed, or at least the seminal tinctures, remaining in their original and native soil, when the present obstruction is removed the earth will be apt to put forth the same plant again: so that, if balsam were at first a native of Judea, and not imported from abroad; and though it were not translated into Egypt, or elsewhere, I am persuaded the natural earth would have again produced it, unless the temper of it were much altered by some accidental or supernatural cause." The arguments here used by Ray depend upon his own personal observation, and his disbelief in the existence of any local plant; but in the present extended state of our botanical and geographical knowledge, we can no longer admit his assertion to be true. However, as Ray justly observes, we cannot be absolutely certain that any local plant does exist, until we have travelled over and investigated the whole world, which, even at the present day, is far from having been performed. Yet, as far as our information extends, and arguing from what we certainly know of the world of Flora, the existence of local plants, far from being impossible, is, humanly speaking, almost positively determined. Whether or not any plants formerly known are now lost and destroyed, it is not my intention either to confirm or refute. Yet many which are mentioned in the writings of the Greek or Roman naturalists are not identified with any at present described. But we can form no positive opinion from this, since we are well aware of their imperfect and superficial mode of examination, and how very little reliance can be placed on their authority in doubtful cases.

And now, in conclusion, I shall be expected to state what hypothesis appears to me the most rational, and to account most satisfactorily for the universal distribution of plants. I cannot, as I have before stated, agree with the opinion of Linnæus, who supposes them to have emigrated from one original locality; as this theory, however probable it might appear at the time of its promulgation, is altogether repugnant to our knowledge of nature, and the present state of the science. Nor, in the second place, can I embrace the opinion of those who suppose that vegetation migrated from primitive centres situate in various parts of the world, and containing plants exclusively belonging to them. It appears to me that the dispersion of plants depends upon several causes, influenced not only by temperature and climate, but in a still greater degree by the composition of the soil, and geological structure of the country; in fine, that vegetation is the joint produce of soil, temperature, and particular composition of the surface of the earth.

I am, Sir, yours, &c.

Richmond, Yorkshire, Dec. 3. 1830. J. E. L.

Art. VIII. *Remarks on the Formation of the Dead Sea, and the surrounding District.* By J. W. Draper, Esq., and W. M. Higgins, Esq. F.G.S.

From the authority of Scripture (Genesis, xiv. 3.), and traditional evidence, no one will deny that the present Dead Sea was once the well-watered and fertile Plain of Jordan, in which Lot resided when the five cities were overwhelmed; and that this lake had no existence previously to that catastrophe. We have also evidence from the ancient lavas, pumice, and volcanic productions, that the eruption of a volcano, situated to the south-east of the lake, was the immediate cause of this scourge; but it is now either extinct, or in the phase of prolonged intermittence.

The wells of naphtha, and the hills of sulphur, are spoken of by every traveller; and, in some places, the soil is so impregnated with these inflammable substances, that it only requires the application of a burning torch to set it on fire. In various parts of the Holy Land, lava has been employed in the construction of roads. Pumice, obsidian, and ashes are scattered over the face of the country; and craters have been discovered in various parts, among rocks of porphyry and syenite: and it appears probable that the igneous nature of the district, the native country of the fire-worshippers, had some effect in forming the religious opinions of the idolaters who chose it for their residence.

Dr. Daubeny has given a very interesting account of this district, in his work on volcanoes; but in some particulars we differ from him as to the origin of the Dead Sea.

" I should suppose," says the doctor, " that the same volcano which destroyed the cities of the plain threw out, at the same time, a current of lava sufficiently considerable to stop the course of the Jordan; the waters of which, unable to overcome the barrier, accumulated in the plain Siddim, until they converted it into the present lake." The natural termination of the river was thus altered; its estuary, which he supposes to have before opened into the Elanitic branch of the Red Sea by Akaba, was entirely destroyed; and the waters which it brought down from the mountains of Antilibanus were dissipated by evaporation from the Dead Sea, which is a mere accumulation of them: its extent being determined by the temperature of the air, which induces evaporation from its surface in a direct proportion to the quantity brought into that sea by the Jordan and other streams.

Although we admit, in its general outline, the geological picture which Dr. Daubeny has drawn of the Holy Land before the catastrophe which destroyed the cities of the plain, there is one feature in which he is, perhaps, misled; and that is, in assigning to the Jordan a southerly direction. He speaks of a great longitudinal valley, discovered by Burckhardt, as the channel through which its waters were once discharged. But the probability is, we think, that this river was either lost before it reached Akaba, or it turned to the west after passing through the Vale of Siddim, and fell into the Mediterranean Sea. For we cannot imagine that so small a river as the Jordan, fed by so few auxiliary streams, could find its way through the broad gorges [outlets] of El Araba and

El Ghor (where the temperature is often 100° in the shade), without being evaporated before it could run a course of two hundred miles.

But Dr. Daubeny, as we have already stated, imagines the Dead Sea to be an accumulation of the waters brought into the Vale of Siddim by the Jordan; yet it is not easy to imagine how this can be its origin. The streamlet of Puy de la Vache may produce the Lake of Aidat; but the sun which shines on Auvergne is cold in comparison with that which shines on the asphaltite lake. It is far more probable that the earth on which the devoted cities stood sunk inwards at the time of their destruction, and that the lake was then immediately formed, as in the case of Euphemia.

"The Dead Sea," says Maundrell, "is clear, salt in the highest degree, bitter and nauseous." Now, these properties are entirely owing to the muriates of lime and magnesia which exist in it. But these salts do not exist in the Jordan; and, therefore, they must have been added to the waters of Jordan after they formed this lake (if, indeed, the lake were formed as Dr. Daubeny supposes), as they do not exist in the Jordan. Dr. Daubeny gives two analyses, but they both militate against his opinion; for the river contains more of the salts of potash than the sea. These salts are derived from the decomposition of the feldspathic rocks to the north of Jericho; and although it may be supposed that this source is unequal to the production of a quantity that could be noticed in the Dead Sea, this objection vanishes when we recollect that our own country is dependent on a similar decomposition of the rocks in northern India, for the production of nitrate of potash, or saltpetre, so extensively used in the manufacture of gunpowder.

We may here remark that all the analyses of the waters of the Dead Sea, which we have seen, are decidedly erroneous; and that by Hermstaedt, which Dr. Daubeny prefers, appears to us the worst: for we cannot understand how sulphate of soda and muriate of lime can exist together in the same liquid. We have recently had an opportunity of analysing some specimens of *Fùcus vesiculòsus* and *Críthmum marítimum* which were gathered on the shores of the Dead Sea, and found them to contain iodine in much the same quantity as in similar plants growing on the coast of Kent: and this leads us to suspect that an accurate analysis would discover the presence of hydriodate of soda in that sea.

REVIEWS.

Art. I. *Catalogue of Works on Natural History, lately published, with some Notice of those considered the most interesting to British Naturalists.*

Gould, John, A.L.S.: The Birds of Europe: dedicated, by permission, to the President and Council of the Zoological Society of London. Part I. 20 plates; imperial folio. 2*l.* 10*s.* plain; 3*l.* 3*s.* coloured.

Mr. Gould already ranks high, and most deservedly so, with the public, as well as among ornithologists, for his splendid *Illustrations of the Birds from the Himalaya Mountains,* which work was completed at the beginning of the present year, in a manner equally creditable to himself and satisfactory to his numerous patrons. Almost all the copies of this beautiful work that were printed were subscribed for.

The first part of his new work, now before us, is, like the former one, admirably executed, and well calculated to add materially, and we hope also substantially, to his future reputation. With a zeal and perseverance which few obstacles can retard, the author unites within his own resources all the advantages that indefatigable industry and a high order of pictorial talent can supply.

Next to the birds of our own country, those of the European continent are most worthy the study and regard of every British ornithologist; since, with the exception of occasional visits, "few and far between," by stragglers from America, most of the additions to our British catalogue are furnished from the other countries of Europe, more than one third of the birds of which have never yet been taken on our island.

But it has frequently been matter of remark, and even of censure, that the productions of distant countries have received a much larger share of attention than those objects by which we are more immediately surrounded; and it is certainly true, that, while numerous and costly illustrations have made us acquainted with the ornithology of all the other parts of the world, the birds of Europe, in which we are, or ought to be, most interested, have remained, by comparison at least, neglected, unfigured, and in proportion unknown.

We are not aware of any work which includes figures of all the birds of Europe, if we except Werner's *Illustrations of M. Temminck's Manuel d'Ornithologie.* This work, which is published in 8vo, gives but one figure of each species. Mr. Gould's work is imperial folio, uniform in size with the work on the Himalayan birds, and represents, in various figures, the peculiarities of plumage induced by age, sex, or season; and a page of letterpress, of equal size, placed opposite each plate, at once sufficiently scientific and popular, supplies in description the most interesting details of the history of each species.

The work is to be published quarterly. The first part contains twenty plates, of which fifteen are devoted to the birds of England, and five to those of the European continent; representing together thirty-five figures of birds, many of them of their natural size, which, for accuracy of outline, natural colouring, and appropriate landscape, are equal, if not superior, to any other ornithological production in Europe.

The various subjects, selected with judgment, are drawn on stone by Mrs. Gould, and rival the best of those in the Himalayan work *; while additional and most appropriate landscape, with all its varied accessories of rocks, water, trees, and herbage, is delineated with the boldness, truth, and character of highly finished chalk drawings. The whole of the plates are printed by Hullmandel, and coloured by Bayfield. No better cooperators in their departments could have been secured or selected.

Among the various plates it is difficult to particularise, where all are excellent. From the genus Fálco two examples have been chosen. Of the lesser kestrel (F. *t*innunculöides *Natter*), so closely allied to our well known common kestrel or windhover (F. *T*innúnculus *Linn.*), the attitude is natural, and the resemblance exact; and the fine dark slate-colour of the adult male of Fálco rùfipes *Bechstein*, which forms the subject of the second plate, is well contrasted with the bright silvery bark of the beech tree, and the general rufous tinge of the female, with which he is grouped. The brilliant plumage of the kingfisher, the mazy zigzag markings of the more sober-coloured wryneck, and the magpie peering out from his leafy oak, are alike true to nature; nor are the various warblers, the red-legged partridges, the rail, the grebes, or the golden eyes, less worthy of particular notice. The artist and those associated in the undertaking appear equally qualified to depict the various inhabitants of the air, the trees, the land, the marsh, or the water; and much of that which constitutes real excellence will be found in this work, which we have examined with pleasure, and recommend with sincerity.

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* See p. 190. of the current volume of this Magazine. — *J. D.*

Anon.: Popular Zoology; comprising Memoirs and Anecdotes of the Quadrupeds, Birds, and Reptiles in the Zoological Society's Menagerie; with Figures of the more important and interesting. 12mo, 400 pages. London, 1832. 7*s.* 6*d.* in cloth.

In this conveniently sized manual, the woodcuts, we believe, exceed 100; there being about 15 of the buildings and views in the gardens, and about 92 figures of as many animals: the total number of animals described in the volume is still greater. The woodcuts of the animals, although not faultlessly, are respectably, executed. The descriptions consist of statements of the distinguishing points of difference between one species of animal and another, and therefore of incidental notices of structure; but chiefly, and more abundantly, of narratives, compiled from authors of credit, of the native habits, manners, office in the plan of Providence, and instincts of the respective animals. The book is an amusing and instructive, and consequently a useful, one; but the state of science of this day might have produced a better. The animals described are not made to succeed each other in sufficient accordance to their resemblances in form and structure; and as the index is alphabetic, no arrangement in the work itself could have been less convenient than the present one, an alphabetic index being an extricating clue to every difficulty. For a second edition, the compiler will do well to keep his eye on system; and we conceive the value of such a work might be increased a thousand-fold, and not rendered at all puzzling, repulsive, unpopular, and thereby unsaleable, were woodcuts, illustrative of the structure of the organs most subservient and ministrant to the necessities and habits of particular animals, and, indeed, of animals generally, introduced, either in addition to, or in preference to, figures of their outline and contour. At this day, surely, a figure of an elephant is less desirable than sectional figures of its trunk, and of the lobulate divisions of its foot, &c. In the feline race, too, pictures of the lion, tiger, &c., are needless, and almost useless: not so would be cuts exhibitive of their prehensive capacity of talon, of jaw, and power of dental execution. In the beaver, let the peculiarities of the incisor teeth, and the extraordinary structure of the tail, be especially illustrated: and so of some peculiarity of structure in every species of animal whose habits of life are in the least peculiar. Among the bills, talons, legs, wings, &c., of birds, much of this kind of illustration would prove delightfully assistant to the memory, in preserving a recollection of the habits and manners of the various species or genera to which these peculiarities of structure might belong. — *J. D.*

MISCELLANEOUS INTELLIGENCE.

Art. I. *Natural History in the English Counties.*

SOMERSETSHIRE.

The Córnu *Ammònis occurs in the West of England, and was once there the Subject of a flagrant Superstition.* — Sir, The following extract, which shows the opinion of our forefathers on that beautiful fossil, the *Córnu* Ammònis, will perhaps interest some of our readers. I am, Sir, yours, &c. — *J. A. H. Oxford, Jan.* 21. 1832.

"Upon the same river Avon, which is the boundary here between this county (Somerset) and Gloucestershire, on the western bank of it, is Cainsham, so named from Keina, a devout British virgin, whom many of the last age, through an over-credulous temper, believed to have changed serpents into stones, because they find sometimes in quarries some such little miracles of sporting nature. And I have seen a stone brought from thence, winded round like a serpent, the head whereof, though but imperfect, jutted out in the circumference, and the end of the tail was in the centre. But most of them want the head." (*Camden's Britannia*, edited by Edmund Gibson, 1695.

HAMPSHIRE.

Gigantic Specimen of Pezìza *coccínea* Scopoli. — Sir, I send you a sketch of a splendid specimen of *Pezìza* coccínea, gathered a few days since [March 13. 1832] near Alton, in Hampshire. It answers the description of *Pezìza* coccínea in Withering's *Botanical Arrangement* more nearly than any other, and may perhaps be a variety of it; at least, as I know no better, I call it *Pezìza* coccínea; but its dimensions are much beyond the usual size, being 8½ in. in circumference. The stem and root, too, are of unwonted length. The smaller plant, of which a part only is seen in the drawing, is of itself larger than we generally find the *Pezìza* coccínea, although so far below its companion in size. It grows from the same nervelike stem or root; for it is difficult to say where the stem ends and the root begins. The colour of the cup is, without, whitish, tinged with pink and buff; and, within, rich scarlet. It is a magnificent-looking thing, and more like the luxuriant productions of tropical countries than the offspring of our own "chill clime and weeping skies."

general thing, these same scarlet pezizas have been
y fine this season, and most abundant from early in

January down to the present time. The wet mild winter has doubtless been congenial to them; and this specimen was favourably situated in a sheltered bank, deeply covered with leaves, and guarded by bushes; a rampart which effectually concealed it from passers by, though growing by the side of a public road, but could not screen it from the observation of the botanist intent to discover the earliest gems of spring. This plant has often been called a fairy goblet: our specimen might rather be deemed a fairy bath. — *S. W. Wyards, near Alton, March* 13. 1832.

We have judged it needless to engrave our correspondent's sketch, as the *Pezìza coccínea*, so strikingly beautiful in colour, is very well known, and the above remarks sufficiently portray the magnitude of the specimen: should that specimen have been but a large one of *Pezìza coccínea*; and if of any other species, we doubt if the sketch supplies better marks of specific distinction than the above description does. It may be remarked, that all parts of the specimen seemed proportionately large. — *J. D.*

KENT.

The Museum of Natural History at Canterbury. — Sir, Happening lately, in my travels, to be passing through Canterbury, I naturally felt a desire to pay a visit to the museum of the Philosophical and Literary Institution of that city. The day of the week was Thursday, which I was informed was not a *public* day. (Ought not *all* days to be public, except, of course, the Christian sabbath, and perhaps one other day of the remaining six appropriated to the necessary cleaning of the room, arranging of subjects, &c. &c.?) I found, however, not the slightest difficulty in gaining admittance, being at once referred to the exhibitor, Mr. Davey, who most readily waited on me, and from whom, I am bound to say, I received every polite attention. As my time was short, I thought it preferable, after walking round the room, and taking a very cursory view of its general contents, to devote the short space I had to spare, to one particular department. That department was the British insects; and it is to one order only of these that my present remarks shall be almost exclusively confined. I think you will agree with me, that provincial museums, like the one in question, ought to be rich in the productions of their own immediate neighbourhoods. Now, as the county of Kent is perhaps, of all the English counties, the very paradise, as it were, of entomology, affording very many rare species; and, moreover, from its vicinity to London, having been well investigated by industrious and able collectors, one might have expected to find in the Canterbury museum, to say the least, a *good* collection of British insects. In this respect, however, I was much disappointed. In the first place, the British and foreign insects are deposited in one and the same case; a practice highly objectionable. Next, the collection, though it contains some rarities, is by no means extensive, being deficient even in some of the local species of the county; nor are the specimens, in very many instances, well preserved. But what I have most to complain of is, that the very worst specimens in the whole collection are those of the commonest insects; specimens ill set, or rather not set at all, and such as could not have been fair and good when first deposited in the cabinet. It is perfectly allowable, I am aware, to admit worn and mutilated specimens of *rare* insects; because no better, perhaps, can be procured; and a bad specimen is better than none; but to illustrate the commonest species by examples miserably preserved in the first instance, is as intolerable as indifferent poetry, which, we are told,

> "Non homines, non Dî, non concessere columnæ."
> "Neither gods, nor men, nor posts, can bear."

Perhaps the collection is yet in its infancy, and therefore ought not to be too severely criticised; and perhaps there may be no gentleman connected with the institution, whose attention is particularly turned to entomology. If this be so, I would strongly recommend the directors at once to discard full half of the British Lepidóptera; and either to employ some competent collector one day in each of the months of May, June, July, and August, of the ensuing summer, for the purpose of procuring fresh specimens in the room of those rejected; or else (which might be the readiest plan) to expend a few shillings with Mr. Le Plastrier of Dover, who preserves his insects in the most perfect condition, and disposes of them at very moderate prices, and who, in a case like the present, from his love for the study, I have no doubt would be ready to deal on the most liberal terms. Perhaps I shall be told, in answer, that many of the insects have been *presented* to the museum, and therefore it would be ungracious to discard them. But could any gentleman, I would ask, reasonably take offence at finding far better specimens of particular insects substituted in the room of his own less perfect contributions? If so, such contributions must be considered only in the light of encumbrances; just like shabby articles of perishable furniture injudiciously left as heir-looms in a family, which the possessor, of course, wishes might belong to any one rather than himself. I observed, also, that, in some instances, the insects were not distinguished by their names; and this, too, in cases where there could be no difficulty or doubt in correctly applying the names; for example, there were Nemeòbius Lucìn*a*, and Melitæ`*a* Dictýnn*a*, and Cínxi*a*, all placed (and properly enough) in juxtaposition, but without any distinctive separation to denote them as being three different species; so that a person little conversant with insects, on viewing the collection, might naturally suppose them to be the different sexes, or varieties, of one and the same species. Among other less common *P*apiliónidæ, I observed Apatùr*a* I`ri*s*, Lycæ`n*a* díspar, and Pámphil*a* Paníscus; and, adjoining to *P*apílio Machào*n*, one example of Podalíriu*s* (scarce swallow-tailed) which I was informed had been presented to the museum as a native specimen. If such it be (which, however, I very much doubt), the date and place of its capture ought to be particularly noted. I know that there are grave and reverend authorities for inserting this fine insect in the list of British species; but, unfortunately, when these come to be sifted and investigated, their authenticity always appears to be involved in not a little doubt and uncertainty. I apprehend that there is hardly to be found at present, in any cabinet, a single well-authenticated *native* specimen of *P*apílio Podalíriu*s*; and that its existence as a British insect is generally disbelieved by the most competent judges. The collection of *P*halæ'nidæ in the Canterbury museum is much less extensive than that of the *P*apiliónidæ; and many of the *common* species are in equally bad preservation. I would entreat the directors to throw aside, among others, their wretched specimens of magpie moths and garden tigers, along with those of Vanéss*a* Atalánt*a*, and Cýnthi*a* cárdui, &c. &c., which are a disgrace to any cabinet. It strikes me as being bad policy to exhibit such examples, because they have a tendency to deter people from contributing to the collection; while a display of specimens in good condition, and well kept, would have the opposite effect of inducing them to contribute. Nobody cares to add to a bad heap; but every one would feel a pride in adding to that which is already good. Such, at least, are my own feelings, and, if I mistake not, those of many others. Should these remarks appear severe, I can assure those whom they may concern, that they have not been offered in a bad spirit; so far from it, that, if I had not at heart the welfare of such institutions, I should not have been at the trouble to point out the evils, and their remedies, as I have now done.

Before I conclude, I have a word or two to offer on the corresponding portion of the *Synopsis of the Museum*, p. 88. to 91. This appears to be meagre, and sometimes incorrect, and the articles brought most prominently into notice not always judiciously selected. Thus, e. g., a single glance at the British catalogue of *P*apiliónidæ will show the following passage to be incorrect: — "The species," says the writer of the *Synopsis*, "of the other families" [i. e. all except the E'quites Achìvi and Trojàni of Linnæus], "being many of them European, and their history and manners better known, *have derived their names chiefly from the plants upon which the caterpillars feed.*" Fifteen or sixteen only, out of a list of about sixty-four well ascertained British species, are so named. Again, under the head of Póntia brássicæ, we read, "It is this, and the three species, ràpæ, nàpi, and sinàpis, which, in their larva state, commit such devastation in our gardens." Leucophàsia sinàpis, which is far from being an abundant species, is almost exclusively confined to woods, seldom straying far from the spot where it was bred: its caterpillar, I will venture to say, commits no injury on our gardens. In the same page (89.), Còlias Edùsa is stated to "occur in England *once in three years*, in some seasons only locally, in others, *in the greatest profusion in every part of the country.*" Its plentiful occurrence is not, as here stated, once in three years, but at indeterminate periods, which, accordingly, we cannot calculate; as we are told immediately after: — "Entomologists are at a loss to account for the periodical, but *irregular*, appearance of this and some other species," &c. Nor is it by any means correct, to say that in other seasons it occurs in *the greatest profusion in every part of the country.* As far as my observation goes, it is chiefly in maritime counties that it occurs in much abundance. In such only have I ever seen it plentiful; and I can vouch for it, that there are many midland counties, with which I am well acquainted, in which I have scarcely ever seen a single specimen during more than thirty years' experience. *Sphínx* A'tropos, we are very truly told, "is the largest . . . of the British species of this genus, *although in Egypt and India it attains double the size.*" This must, at any rate, be a *thumper*, though I am not prepared to deny the truth of the statement. Before a second edition of the *Synopsis* is published, I hope this portion of it, at least, will receive great alteration and improvement.

Though I promised to confine my remarks almost entirely to the British Lepidóptera, I cannot conclude this notice without expressing my unqualified admiration of the collection of vegetable skeletons, exhibiting the nerves and veins of the leaves and seed-vessels, &c., of plants. These, we are informed, were principally executed by Mr. Crow: they are unquestionably the most beautiful and perfect things of their kind I ever beheld; so much so, indeed, that it would be worth while to employ the same ingenious operator to extend the collection by the addition of other interesting specimens prepared in the same exquisite style. Apologising for the length of this notice, which has far exceeded my original intention, I remain, yours, — *Viator. From the King's Highway, Sept.* 20. 1831.

Lathræ'a Squamària L., *Dentària bulbífera* L., *and other Rarities*, are to be met with about Tunbridge Wells. The Dentària bulbífera is very abundant there. — *Wm. Christy, jun. May*, 1832.

ESSEX.

Dagenham Breach. — Sir, A great fondness for angling has led me to many celebrated places for practising the art, round the metropolis; and there is none frequented by the "lovers of the angle," as old Izaak quaintly calls the fraternity, of a more interesting character, as respects its natural history, than Dagenham Breach, near Barking, in Essex. It is well known that this fine piece of water was occasioned by a disruption of the banks of the Thames, in the year 1705 or 1708; an interesting account of which is given by Derham, in the *Philosophical Transactions* for one of those years. Although scarcely sensible to the taste, the water contains a considerable quantity of muriate of soda, or common salt; in many places it is extremely deep, and abounds with fish. Among those most commonly caught are pike (*E'*sox *L*ùcius *L.*), perch (*P*érca fluviátilis *L.*), bream (*C*ýprinus *Bràma* L.), roach (*C*ýprinus rùtilus *L.*), rud (*C*ýprinus *O'rfus* L.), and not so frequently carp (*C*ýprinus Cárpio *L.*). Eels (*M*uræ'na*A*nguílla *L.*) are also taken in considerable quantities. These fish, I am aware, are all sufficiently common in most large pieces of water; but there is one which, the keeper assured me, is caught there, in small numbers, every year, in the nets, that pleased and surprised me to hear of, the anchovy (*C*lùpea *E*ncrasícolus *L.*). He said they usually caught about a dozen every year. Never having heard of this fish being found in fresh, or nearly fresh, water before, although Pennant, in his *British Zoology*, says they are taken in the estuary of the Dee, I am disposed to think that the keeper has mistaken some other fish for the anchovy; but what other, it is difficult to guess. Being curious to know if the anchovy is found in any freshwater lakes or rivers, I beg an answer from some of your ichthyological readers.

Sea Fish in Dagenham Breach. Some years since, Mr. Fry, the present proprietor of Dagenham Breach, made an attempt to stock it with sea-fish, and some hundreds of small cod (Gàdus *Mérhua L.*) and other fish were put in. That they should not live, was probable enough; but, what is very singular (I speak on the keeper's authority), from the time of their being put in, to the present, not one has been seen, either alive or dead. It has been conjectured that they died, and the eels, and other fish of prey, devoured them: but that the eels, voracious as they are, should not have spared one, to tell the tale of their destruction, is beyond the bounds of probability.

The Bearded Titmouse (*Pàrus biármicus*) *inhabits Dagenham Breach.* Dagenham is also interesting from a rare and beautiful bird which annually frequents it. On the sides of the lake grows, with a luxuriance not often seen, that elegant plant, the common reed (*A*rúndo *P*hragmìtes *L.*); and, about November and December, may be seen feeding on the seeds of this plant the beautiful bearded titmouse (Pàrus biármicus), or red pheasant, as they there call it. — *O.* *Feb.* 1832.

The bearded titmouse is not rare in the marshes of Erith, in Kent, as well; as appears by the following remark in Knapp's *Grámina Británnica,* where it occurs incidentally, in the description of the common reed (*A*rúndo *P*hragmìtes *L.*). "The panicles of the *A*rúndo *P*hragmìtes continue through the winter; and in the marshes of Erith, in Kent, are resorted to in that season by that very rare bird, Pàrus barbàtus [*Brisson,* Pàrus biármicus *Gmelin*], to seek for in them either the minute seeds they may contain, or the insects that have sought an asylum there." — *J. D.*

NORFOLK.

Origin of the Crag Stratum of Norfolk. — Sir, From the attention I have paid to the subject, I have reason to believe that the crag stratum of Norfork is the result of an ancient estuary, the existence of which dates prior to the deluge of the Scriptures. It has been traced northward of Norwich, in the parishes of Wroxham, Belaugh, Horstead, Marsham, Aylsham, &c., to Cromer; and westward of Cromer at Weybourne. I conceive, that if two parallel lines were described southward of the two last-mentioned places, with a little inclination to the east, a tolerably correct idea would be had of the extent of this estuary. After an attentive enquiry, I have never been able to ascertain that regular beds of crag exist beyond these limits: on the contrary, eastward of this tract, ligneous and mammalian remains have been found in abundance; indicating that it was once dry land. The vestiges of this estuary are precisely the results we witness of the action of the sea upon our present shores; as, in addition to the successive layers of sand, clay, shells, and other rejectamenta incident to a sea beach, we find, where its bed was chalk, the surface covered with loose flints; in some places, the chalk is perforated, by the action of the water on small pebbles, to the depth of several inches. The principal fact to which I would particularly direct the attention of your zoological readers is, that, in a pit near Postwick Church, the upper surface of the chalk, in its whole extent (about thirty yards), is perforated by an animal belonging to a genus of the family Tubícolæ (*fig.* 100.); but which, as far as I have at present been able to ascertain, is undescribed. That an animal of the same nature still exists in the present seas is certain, as there is scarce a specimen of the Septària dredged up off Harwich, for making Roman cement, but exhibits traces of its boring powers. I have also a specimen of oolite excavated by Phólades, the exterior surface of which is closely perforated in the same way. If any of your intelligent correspondents can point out the genus and species of the animal to which these perforations can be referred, I shall feel greatly obliged. The subject will be fully entered into in my forthcoming sketch of the *Geology of Norfolk;* and, without the information here sought, it would necessarily be incomplete. I am, Sir, yours, &c. — *Samuel Woodward. Norwich, Jan.* 16. 1832.

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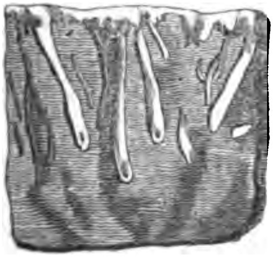

CAMBRIDGESHIRE.

Collectors and Collections in Natural History in the University, Town, and County of Cambridge. — Sir, I send you a list of such collections of natural history as I at present recollect in this neighbourhood, and will endeavour to increase it for you by further enquiry. The four collections belonging to the university are unfortunately little accessible even to the members of the university, and still less so to the public at large. These are, in fact, of no real utility, except to the professors themselves; and, were it not for the prospect of better days, in which the force of public opinion will at length compel the university to provide some better establishment for her museums, it would really be quite disheartening to go on labouring day by day in the accumulation and arrangement of specimens which are destined to remain concealed, and perhaps doomed to rot, without one particle of benefit being derived from their existence. However, there is at length some hope of our obtaining museums which will be placed on as liberal a footing as our public library.

Four university collections	Zoology and comparative anatomy, Rev. Professor Clark.
	Geology, Rev. Professor Sedgwick.
	Mineralogy, Rev. Professor Whewell.
	Botany, Rev. Professor Henslow.

General natural history (containing a good collection of British birds, &c.), Philosophical Society.
British birds, Rev. Dr. Thackeray, Provost of King's.
British birds, Rev. F. Henson, Tutor of Sidney.
British insects and plants, Rev. L. P. Garnons, Fellow of Sidney.
British plants, Rev. H. Kirby, Fellow of Clare Hall.
British zoology and botany, Rev. L. Jenyns, Swaffham-Bulbeck.
British insects and plants, Rev. Dr. Jermyn, Swaffham-Prior.
Mineralogy, Rev. H. Coddington, Fellow of Trinity.
Geology (a curious and extensive collection, from the diluvium in the neighbourhood), Rev. J. Plumptree, Great Gransden.
Shells and eggs, Rev. Dr. Lamb, Master of Corpus.
Mineralogy, Dr. Ingle, Fellow of Peterhouse.
British plants, Dr. F. Thackeray, Cambridge.
Mineralogy, Rev. T. Turnbull, Fellow of Caius.
Mineralogy and geology, Rev. W. Mandell, Fellow of Queen's.
British plants, Rev. W. Keeling, Fellow of St. John's.

I have not mentioned other collectors among the under-graduates, whose residence here being ended at the expiration of three years, they carry their collections away with them. I may mention, however, that Mr. Deck, chemist, in the town, yearly imports a considerable number of minerals from the Continent, as well as other objects of natural history, for which he finds a ready demand; and that his shop is a most useful magazine of all sorts of collecting apparatus in entomology, botany, &c. Yours, very truly,—*J. S. Henslow. Cambridge, Sept.* 6. 1831.

Mr. Thomas Denny, of the Hills' Road, near Cambridge, may also be mentioned as an available channel through which to participate the animal productions of Cambridgeshire. Mr. Denny captures and purchases for sale the insects of the county; as he does the skins of birds and other animals, which he also stuffs both for himself and for others — *J. D.*

WARWICKSHIRE.

Weaver's Museum of Natural History in Birmingham. — Sir, It may be gratifying to your scientific readers, and to the lovers of science generally, to learn that a museum has sprung up in the heart of the kingdom, which may vie in extent and splendour with any provincial collection in the world. I shall, therefore, make no other apology for troubling you with the present communication, than what may be deemed necessary as a palliation of the inability with which I shall describe its various and important contents.

About fourteen years since, Mr. Weaver of Birmingham commenced the study of entomology (chiefly from an innate love of science, and an admiration of the splendour and fitness of natural forms), and began to make a collection of insects. Without fortune, or any of the facilities generally considered necessary for accomplishing great and arduous undertakings, but by the aid of persevering industry alone, he contrived, at various periods, to visit most parts of England and Wales, in pursuit of his favourite object. Being possessed of a quick observation, he was enabled, in a great number of instances, to discover the localities of insects entirely new to science, many of which are already familiar to the public, through the medium of the valuable *Illustrations of Entomology* now in progress of publication by Mr. Stephens; and eventually succeeded in bringing together and preserving upwards of five thousand species of British insects, which are now scientifically arranged in cases, and which were thrown open to public inspection, gratuitously, for the space of five years. During this period, his collection of insects was inspected by most of the ladies and gentlemen in the neighbourhood who had formed an attachment to similar pursuits; by great numbers of visiters from distant parts of the united kingdom; and by noblemen and foreigners who had accidentally learned that so very extensive a collection existed, in the possession of an individual at that time living in the most complete seclusion, and entirely out of the reach of public notice.

At this period of his career, Mr. Weaver had to obtain the means of gratifying his thirst of knowledge, such as the expenses of travelling, and the cost of his cases and glass, by the most indefatigable and unwearied industry, at the occupation to which he, like many other men of genius, had first of all been reared. This circumstance ought on no account to be overlooked, in giving a description of the gradual progress of such an undertaking as the one at present under consideration, because it shows that the mind will overcome the greatest obstacles whenever they stand in the way of its efforts to achieve a noble and praiseworthy purpose. Splendid talents, indeed, more frequently emerge from humble dwellings, and progress through the trammels of some opposite sedentary employment, than they are found to discover themselves in what might be deemed their true and legitimate nursery. On this account, they have a demand upon the fostering care of the more fortunate, and possess a peculiar claim upon those who, having a love of the same pursuits, have yet been spared the pains attending them, and left at liberty to acquire the means of greater ease and comfort.

Having received many of these flattering marks of attention, and promises of extensive patronage, if his efforts were extended to other branches of science, Mr. Weaver next engaged premises in New Street, with a view of forming a museum of natural history. During his residence here, his attention was directed to ornithology, with so much success, that he preserved about two hundred species of British birds (nearly a complete collection), and afterwards made considerable progress towards a perfect collection of foreign birds, as he had previously done of foreign insects.

Finding at length that his cases accumulated upon him so rapidly that these premises were inadequate to contain them in a manner in which they could be inspected to advantage, he resolved upon the arduous task of engaging the Institution Rooms, in Temple Row. This elegant suite of rooms had been erected by the Associated Artists, as exhibition rooms, and had then become vacant by a union having taken place between the former body and the members of the Society of Arts. In this establishment, he has applied himself successfully to conchology and mineralogy, in both of which branches he possesses the most splendid specimens; and these, in addition to a great variety of rare miscellaneous objects, certainly constitute a subject upon which the eye may dwell, and the mind contemplate, with a satisfaction at once pure, rational, and in the highest degree gratifying.

The large room in which the collection is now opened to the public is 50 ft. long, by 25 ft. wide, lofty in proportion, and lighted from above by five lights on each side, inclining at such an angle as to exhibit pictures to the greatest advantage, and therefore in the highest degree adapted for the purposes of a museum of natural history. The cases of British insects are ranged down the centre of the room, forming the appearance of a desk, inclining each way in such a manner as to meet the eye; upwards of twenty large cases of foreign insects are similarly placed across the end, and on one of the sides; and more than thirty similar cases of minerals and shells fill the other side; the cases of birds occupying the walls.

I may now take the opportunity of mentioning that Mr. Weaver's undertaking has received in its support the patronage of some branches of the royal family, many of the neighbouring nobility and gentry, with a tolerably extensive list of subscribers; and that he is anxious to have it understood that he will feel himself honoured by the presence of any scientific gentlemen who may by chance pass through the town, to inspect his collection, and make such a report of it in their respective localities as they may deem it entitled to, according to the time and the means which have been brought into operation in forming it.

In addition to the above, Mr. Weaver has been honoured by the distinguished patronage of the Zoological Society, in a grant of twenty-four rare birds, presented through the medium of Mr. Vigors, by a vote of the Council; and for which mark of especial favour and encouragement of science, he is anxious to make every public acknowledgment in his power to that learned and liberal body. I am, Sir, yours, &c.—*J. Wallace. Birmingham, Nov.* 28. 1831.

A fossilised Fish and Ichthyosaúrus found in a Stone Quarry near Stratford upon Avon. — Sir, I enclose you a drawing (copied in *fig.* 101.) of an ichthyolite lately found in my stone quarry at Wilmerts, near Stratford upon Avon. Upon splitting the stone, which was 19 in. long, 11 in. broad, and about 4 in. thick, almost the whole of the fish was found attached to one side of it, as represented in the drawing; upon the other side of the stone is an exact impression, with the fins and a few of the scales only attached; the colour of the fossil is dark brown, and glossy; the scales are very perfect, and but slightly attached to the body.

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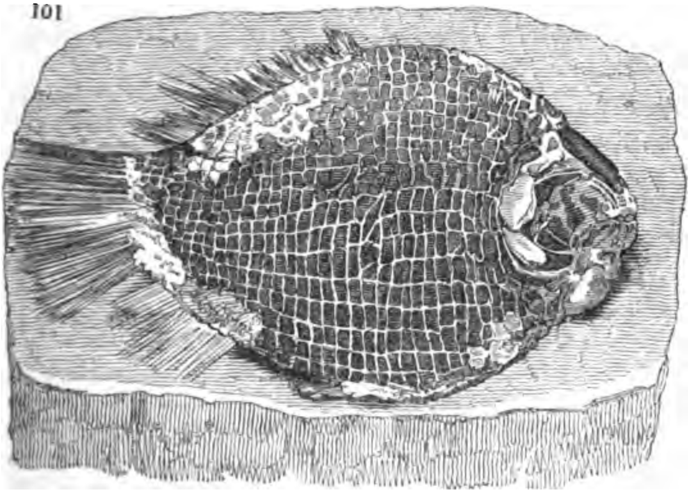

In the same quarry, and near the same spot, was found an Ichthyosaúrus, which my son gave to Mr. Sharpe, solicitor in the Old Jewry: it is considered to be a very fine specimen. I am, Sir, yours, &c. — *John Greaves. Edgebaston, Nov.* 12. 1830.

NOTTINGHAMSHIRE.

Menzièsia poliifòlia, Callùna vulgàris, E*rìca cinèrea,* E. T*étralix,* E. *vàgans with white flowers, and* E. *vàgans with pink flowers, inhabit Sherwood Forest.* — Sir, Your valuable correspondent, J. T. Mackay, in communicating some Irish habitats of rare species of British plants (Vol. IV. p. 167.), in giving a habitat of Menziès*ia p*olifòlia, describes it as "nowhere else found in Britain or Ireland." I beg to state that this is an error, as my brother found it growing on Sherwood Forest, Notts, in 1825, along with the plants above named. This is the only instance known to me of the Menzièsia poliifòlia being found in England. I had recent specimens of the plant, and now possess a good dried one. It is but lately, and that by chance, that your Magazine has met my eye, or I would earlier have communicated this fact. I am, Sir, yours, &c. — *Henry Creed. Chedburgh Rectory, near Bury St. Edmunds, Feb.* 9. 1832.

LANCASHIRE.

Observations on the Limestone district of Yealand, near Lancaster, and on the Vegetable Phenomena displayed by the Growth of Plants on one of its rocky Hills. — The mountain limestone of this district, extending from the village of Warton to Kendal on the north, and from the Bay of Morecambe far eastward into Yorkshire, presents many fine features in the landscape. The outline of the hills about Yealand is of an abrupt character; the stratification of the rock being in general much inclined, the strata frequently terminate " into day" towards the summit of the mountain, presenting a bold precipitous crest, beneath which lies the *motionless stream* (if I may so express it) of the debris or fragments which have rolled down from the crag above. Farlton Knot, Warton Crag, Arnside Fell, Whitbarrow and Cringlebarrow Scars, are the principal hills of this description in sight of Yealand: they range in elevation above the sea (by estimation) from 200 to 800 or more feet.

Cringlebarrow Scar, the immediate object of my notice, forms part of a ridge of hills, on the east side of which the pretty village of Yealand is situated. Its eastern declivity exhibits a few cultivated fields and verdant meadows, with plantations of slow growth. The dip of the rock being towards the west, the strata stand out on the eastern side (where not covered with vegetation) somewhat in the form of *stairs*; between the *steps* of which appear sheepwalks or plantations of fir tree. The summit of the " scar " is formed by the termination or " cropping out " of the upper stratum, which dipping at an angle of about 16° towards the sea, to the west, presents on that side an inclined plane or floor of rock, of some acres in extent. The surface of this upper bed of rock presents a very curious spectacle for the geologist; it is cracked (*cringled?*) in all directions, representing on a grand scale the appearance of an earthy precipitate, when undergoing, in the hands of the chemist, a slow evaporation to dryness. So striking is the similarity to that chemical result, that it is scarcely possible to avoid the conclusion that the rock must have once been in a soft moist state of consistency; and that by a loss of the moisture, in the process of drying, the whole surface has shrunk or collapsed in all directions, and thus has succeeded the cracked and fissured state in which the upper bed of rock now appears.* The blocks, or gigantic tessera, of this rocky pavement are sometimes of huge dimensions: the thickness of the upper bed varies; the depth of the crevices, I found, exceeded, in some places, six feet.

It was highly interesting to observe the efforts of nature to clothe with vegetation this hard, arid, sloping floor of rock, which, at a rough guess, I should think, extended north and south about 300 yards, and east and west 200 yards. At its base is a thriving coppice wood, composed chiefly of hazel nut bushes, oak, and ash trees. The hazel (Córylus *A*vellàna *Lin.*), the most prevailing tree of the wood below, is, I think, the most abundant upon the rock above. On advancing up the fissured rock, this species is to be seen firmly rooted within the crevices; its stinted head is twisted down upon the surface of the rock, being often unable to rear itself above a few inches high, on account of exposure to the strong and briny gales from the west. Its seeds, rolling down, are arrested by the mosses, or lodge in the numerous furrows, which are worn upon the surface of the rock by the showers of centuries. I measured the depth of one of these waterworn gutters, which begin immediately after a cross crevice, and gradually deepen in proportion to the length of their course; I found the depth, at six feet length of furrow, to be *seven inches.* These appear to be the channels up which vegetation is advancing most readily from below: being filled near the base with mosses and decayed vegetable matter, many a flowering shrub was to be seen flourishing therein; at a few paces, however, upwards, the shelter of the wood is lost to them; they then dwindle away, and leave the work of vegetation to the hardy yew, the hazel, the ash, and the holly, &c. The yew (*T*àxus baccàta *Lin.*) is to be seen growing in a very curious manner: rooted, like the hazel, in a crevice, with its stinted boughs spreading out in a circular form, and closely folded down upon the surface of the rock, the whole plant strongly resembles a living vegetable mat firmly fitted upon the rocky floor. Several of these plants (spreading out scarce three or four feet in diameter, and rising no higher than a few inches) are probably the growth of a large portion of a century. Not unfrequently this closely matted bush, almost if not entirely incapable of motion by the strongest blast, is to be seen surrounded by mosses and decayed vegetable matter, supporting around its edge the growth of grasses or other species; its own fine leaves, as they wither, assisting abundantly in the formation of an incipient soil. The holly (*I'*lex *A*quifòlium *Lin.*) is more hardy, and faces the western blasts with a somewhat more elevated front; but shows, by its knotted stump and zigzag branches, the hard fare it has to thrive upon. The oak is also, like the holly, able to rear its head but a very few feet above the rock.

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* The texture of this limestone is in general very close, and it is so hard as sometimes to make a fine marble: it has indeed been used for chimney-pieces: those made at Kendal are noted for their beauty.

Within a mile and a half of Cringlebarrow, to the N.N.E., is another, but far more extensive, surface of the rock, cracked up in a similar manner.

Towards the upper part of this limestone declivity, bare spaces are to be met with of many square yards in extent, as yet unattacked by any but the cryptogamous tribe. The variety of lichens, mosses, &c., is very great; and to the lover of this class of plants the whole ridge of hill would afford a rich treat. Near the summit, the surface becomes more broken up, perhaps by the action of frost on water lodging on a surface but little inclined.

Over the summit to the eastward, where the cropping out of the strata produces, as before described, short abrupt precipices, the power of vegetation is again very remarkable, both in breaking down the projecting rock and in covering the fallen fragments beneath. In this work of detachment the ash tree (*F*ráxinus excélsior *Lin.*) takes the lead. Many dwarf stumps or bushes of this tree are to be seen adhering to the crest or sides of the crag, their roots swelled out to an astonishing size, when compared with the very scanty foliage vegetating from them. This scanty foliage has, however, been sufficient to nourish the formation of a vegetable wedge powerful enough, in time, to detach very large fragments of the rock. This is to be seen very favourably at one spot, where an ash root is fixed in a recess of the precipice, whence a mass of rock (5 ft. by 5, and 7 ft. deep, weight about 10 tons) has been detached; the shape of the mass at once proving its coincidence with the recess above. The ash root is partly embedded within the fissure, but a very large portion of it is seen projecting outwards, in girth 4 ft. across: rough, thick, and massive, it carries above a few stunted boughs, which must also have had a struggle to obtain sufficient light to supply its growth. Along the foot of the precipice (which varies from 10 to 20 or 30 ft. in height) are to be found fragments of the rock, of different sizes, strewed about; some have long been clothed with soft moss and grass, others are half concealed in their grassy bed, and others, more recently detached, lie about uncovered: it would be interesting to know how soon they would become wrapped over by the covering on which they fall.

Within a few feet of the edge of the precipice, on the summit, is now to be seen a regular row of ash trees, rooted in the nearest crevice, proceeding to work down the next series of fragment; like vegetable pioneers, preparing to demolish, in the slow course of nature, this rocky barrier. The yew, the holly, the ivy, and other bushes, are also taking a share in this work; but the ash tree is the most prominent in the ranks.

I have seldom seen, either in England or on the Continent, an example so striking as the present of the force of vegetation, in clothing and preparing the barren surface of rocks for future soil and fertility. I have visited this spot several times, at intervals of a year or two; and I have little doubt that, in process of time, the summit of this craggy ridge will be rounded off by the grassy mantle being drawn over it from the pasture surface on the east; while the sloping side, on the west, is receiving its covering from the wood at its base.

The foregoing sketch may convey a useful hint to the proprietor of the neighbouring barren rocky slopes; viz., to plant a wood of the above-named trees, and others, at their western base, with the view of promoting the earlier formation of soil upon them; but how soon such effect would be produced, it would require *long consultations*, indeed, with nature to be able to pronounce.

On the ruined site of an abbey, at the entrance of Dover, is to be seen a group of ash trees growing in the midst of the grassy mounds: I have no doubt they have been the final demolishers of the ruin, the remains of which are now very much covered with grass.—*A. R. B. Laytonstone, near London, March,* 1832.

Some plants are more saxifractory than others; and the genus *Saxífraga*, according to Martyn's *Miller's Dictionary*, receives its name from the saxifractory capabilities of some of the species: to this end, those which grow in large cushion-like tufts (included in De Candolle's section Dactyloïdes) are most subservient. The numerous plants which inhabit rocks, mountains, and hills, are doubtless agents, each more or less effective, in the process of saxifraction. — *J. D.*

YORKSHIRE.

Birds found in the Neighbourhood of Wensleydale, in the North Riding of Yorkshire. — Sir, I am not aware whether I have been anticipated by any of your correspondents in a former volume of your Magazine, in a list of the birds found in this neighbourhood, at the mouth (if I may be allowed the expression) of that romantic part of the North Riding of Yorkshire, Wensleydale, where the river Ure, leaving the valley, begins to enter the plain. The same list, with perhaps a few exceptions and additions, will apply to the neighbourhood of Richmond, a sketch of the flora of which you have already received from the pen of J. E. L. (Vol. IV. p. 24. 467.); so that this sketch of the fauna, should you think it worth insertion, will complete the account of the natural history of this district. Of about 130 species of land-fowl, which are found in Great Britain, this list will exhibit nearly half; and, had I extended it farther up either valley (of the Ure or the Swale), I might have added many curious specimens to it. I have endeavoured to render it as accurate as possible; but I shall be obliged to any of your readers, acquainted with this part of the country, who will add to it. The classification and specific names are those adopted by Mr. Selby in the *Illustrations of British Ornithology*, as far as regards the land-birds; the names of the waterfowl are the Linnæan. A star is prefixed to those birds, of which only one or two individuals have come under my observation.

LAND BIRDS.

Order I. RAPA`CES.

Fálco *B*ùteo, Buzzard.
*N*ìsus, Sparrowhawk.
Subbùteo, *Hobby.
*T*innúnculus, Kestrel.
*S*tríx *O*`tus, Long-eared owl.
flámmea, White owl.
strídula, Screech owl.

Order II. OMNI′VORI.

*C*órvus *C*òrax, Raven.
*C*oròne, Crow.
frugílegus, Rook.
*M*onédula, Jackdaw.
*P*ìca, Magpie.
glandàrius, Jay.
gárrula, *Bohemian waxwing.
*B*ombycívora.
*S*túrnus vulgàris, Starling.

Order III. ZYGODA′CTYLI.

*C*ùculus canòrus, Cuckoo.
*P*ìcus víridis, Green woodpecker.

Order IV. ANISODA′CTYLI.

*S*ítta europæ`a, Nuthatch.
*C*érthia familiàris, Creeper.

Order V. *A*LCY`ONES.

*A*lcèdo I′spida, Kingfisher.

Order VI. INSECTI′VORI.

*H*irúndo rústica, Chimney swallow.
úrbica, Martin.
ripària, Bank martin.
*C*ýpselus muràrius, Swift.

Order VII. *PA*′SSERES.

Lànius *C*ollùrio, *Red-backed shrike.
Muscícapa *Grìsola*, Spotted fly-catcher.
*T*úrdus mùsicus, Thrush.
*M*érula, Blackbird.
pilàris, Fieldfare.
torquàtus, *Ring ouzel.
*C*ínclus aquáticus, Dipper.
Sýlvia Atricapílla, Blackcap warbler.
cinèrea, Whitethroat.
Sylviélla, Lesser whitethroat.
*R*ubécula, Redbreast.
*P*hœnicùrus, Redstart.
*R*égulus auricapíllus, Gold-crested wren.
Troglódytes europæ`us, Com. wren.
Saxícola Rubètra, Whinchat.
Accéntor modulàris, Hedge accentor.
*M*otacílla álba, Wagtail.
*A*laúda arvénsis, Skylark.
A′nthus praténsis, Meadow pipit.
Pàrus màjor, Great titmouse.
cærùleus, Blue titmouse.
Emberìza *M*iliària, Common bunting.
Citrinélla, Yellow bunting.
*S*chœnículus, *Reed bunting.

Lóxia curviróstra *Crossbill.
*P*yrrhùla vulgàris, Bullfinch Grosbeak.
*F*ringílla *C*hlòris, Greenfinch.
  cannábina, Common linnet.
  *C*arduèlis, Goldfinch.
  doméstica, House sparrow.
  cœ\`lebs, Chaffinch.

Order VIII. *C*OLU'MBÆ.

*C*olúmba *P*alúmbus, Ringdove.

Order IX. *G*ALLI\`NÆ.

*P*hasiànus cólchicus, Pheasant.
*T*étrao scóticus Red grouse.
*P*érdix cinèrea, Partridge.

WATER BIRDS.

Order I. *A*'NSERES.

A\`nas *C*ýgnus, *Wild swan.
  A'nser, Wild goose.
  *P*enélope, Wigeon.
  *B*óschas, Wild duck.

Order II. GRA'LLÆ.

A'rdea cinèrea, Heron.
  stellàris, Bittern.†
*S*cólopax arquàta, Curlew.
  rustícola, Woodcock.
  Gallinàgo, Snipe.
  Gallínula, Jack snipe.
Trínga Vanéllus, Lapwing.
Gallínula chlóropus, Water hen.

The river Ure contains minnow (*C*ýprinus *P*hóxinus), dace *C*. *L*eucíscus), chub (*C. Jèses*), bleak (*C. A*lbúrnus), trout (*S*álmo *F*àrio), grayling (*S. T*hymállus), smelt (*S. Eperiànus*), pike (*E*\`sox *L*ùcius). The Swale contains minnow, chub, trout, and barbel (*C*ýprinus bárbus). — *M. R. Dec.* 6.

[We are obliged to our correspondent for this sketch of the fauna of his neighbourhood; but when he mentions that this, in conjunction with the notices of the native plants by J. E. L. (Vol. IV. p. 24.), " will complete the account of the natural history of this district," we must be allowed to remark, that, to this end, notices of the Amphíbia and the insects are yet wanted. — *J. D.*]

A List of Aquatic Coleóptera taken by Mr. Samuel Gibson in about One hundred Yards' length in the Hebden Watercourse. — Sir, The insertion of the accompanying list, and the remarks which follow it, will give pleasure to yours, &c. — *Samuel Gibson.*

Háliplus elevàtus
  ruficóllis
  melanocéphalus
Hýgrotus fluviátilis
  inæquàlis
Hydróporus fràter
  depréssus
  12-punctàtus
  alpìnus
  6-pustulàtus
  Scalesi*ànus*
  géminus
  ovàlis
  nígritus
  triviàlis
  minùtus

Hy. holoseríceus
  pubéscens
  làtus
  Davís*ii*
Colymbètes fontinàlis
  fuliginòsus
  striàtus
  ágilis
  nebulòsus
  Stúrm*ii*
  maculàtus
  chalconòtus
  bipustulàtus
  new species
  new species

*D*ýticus marginàlis
  punctulàtus
Acílius sulcàtus
*G*yrìnus natàtor
  substriàtus
  villòsus
Párnus prolifericórnis
  auriculàtus
E\`lmis Volckmàri
  variábilis
  parallelipípedus
  æ\`neus
  cùpreus
Helóphorus aquáticus
  granulàris
  gríseus

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† Extremely rare till last winter (1829–30), when numbers were killed in this part of Yorkshire.

Helóphorus nùbilus
Ochthèbius pygmæ'us
Enicócerus viridi-æ'neus
    trístis
    Gibsòni
    obscùrus *MSS.*
Hydræ'na ripària
    pusílla
Hydræ'na elongàta
    testàcea
    pulchélla
    melanocéphala
Limnèbius àter
    truncatéllus
    nígricans
Hydròbius fúscipes
    orbiculàris
    bipunctàtus
    glóbulus
    minùtus
    striátulus
    new species.

Hydróporus Davís*ii* has been so named by Mr. Curtis in honour of Mr. A. H. Davis, a correspondent of yours, who, at p. 86., of your present volume, has a communication which I should not have noticed, if Mr. Davis had confined himself to facts. The insect there mentioned never was in the possession of that collector, whose honesty I believe no one has any reason to doubt. The fact is, "the highly respectable gentleman" in question purchased from that collector about 400 species of the several orders. These were given to Thomas Gibson, a boy about twelve years of age, to name. At the same time, Thomas Gibson had another box of insects, belonging to another collector, to name; and, in referring the insect to my specimens, he, by accident, took the Hydróphilus [? Hydròbius, so in Curtis's *Guide*, column 243., and in this Magazine, p. 86.] lateràlis from one box, and placed it in the other, instead of a specimen of Colymbètes chalconòtus. A short time after, the Colymbètes was carefully returned to me, when I went without delay to that "highly respectable gentleman," and wished him to take his insect, and return the Hydróphilus [? Hydròbius] to the owner: the reply was, "No: if I were to give up the insect, you would say you had taken it, and so have the honour of taking a new one." — *Samuel Gibson. Hebdenbridge, Yorkshire, Feb.* 23. 1832.

Rarer Plants in the Neighbourhood of Doncaster. — Sir, I have not seen it noticed that the neighbourhood of Doncaster is peculiarly favourable for the study of botany. That a great variety of rare plants should be found within a few miles of this place is not surprising, when the various kinds of soil and situation are taken into account. In addition to above an average proportion of common and second-rate plants, a great variety of the more esteemed ones is found abundantly in certain localities.

The varieties of soil in the immediate neighbourhood are peat or car earth, limestone, heath and sand land, and the alluvial soil formed on the banks of the river Don, called warp.

Potteric Car has long been known as a locality of numerous rare plants; but I am not aware that any even tolerably perfect list of such plants has been made public. This car extends about six miles south of Doncaster, on the west of the great north road; and the following plants are found there, and on the car land adjoining: — *H*ippùris vulgàris, Pinguícula vulgàris, Genti*àna* Pneumonánthe, Drósera rotundifòlia and D. ánglica, *P*arnássia palústris, Narthècium ossífragum, *A*´corus *C*álamus, Oxycóccus vulgàris, *B*ùtomus umbellàtus, Andrómed*a* *p*olifòlia, *C*ómarum palústre, *N*ymphæ`a álba, *N*ùphar lùtea, *R*anúnculus Língua, *M*yriophýllum spicàtum, and *M.* verticillàtum, Osmúnd*a* regàlis, Aspídium *T*helýpteris, A. spinulòsum, &c. — The *limestone* tract is considerable, and extends many miles west of Doncaster. On each side of the river Don, the following, among other plants, occur on this kind of surface: — Campánula latifòlia and C. pátula, Gàge*a* lùtea, A´trop*a* *Belladónna*, Potentílla fruticòsa, *H*elléborus víridis and *H.* fœ´tidus, Leonùrus Cardìaca, Scrophulària vernàlis, *G*erànium phæ`um, *O*`phrys muscífera and *O.* apífera, Neóttia spiràlis, *E*pipáctis latifòlia, Aspídium cristàtum, A. spinulòsum, A. lobàtum, *A*splènium *T*richómanes, *A.* *R*ùta murària, *A.* *A*diantum nìgrum, and three varieties of *S*colopéndrium vulgàre, &c. — The *heath and sand land* extends east of Doncaster, from the borders of Potteric Car to Hatfield Chase. This kind of land seems most favourable for the growth of annuals, and also of cryptogamic plants, as numerous species are found there, as well as the following: — Scabiòsa columbària, *Œ*nothèra biénnis, Osmúnd*a* regàlis, *B*léchnum boreàle, Aspídium spinulòsum, A. *F*ìlix fœ´mina, &c. — The *warp* is very extensive in those parts immediately adjoining the river Don, which are low, and which are liable to be overflowed by its waters. I have met with the following plants on this kind of land: — *D*ípsacus pilòsus, *Tùlipa* sylvéstris, *C*ôlchicum autumnàle, *N*ùphar lùtea, *G*erànium phæ`um, *I*´nula *H*elè*nium*, Ophioglóssum vulgàtum, &c. — In addition to the above kinds of soil, there are small patches of a very strong clay in certain parts, but the quantity is inconsiderable, except at Clayton, about eight miles from the town of Doncaster: on this soil several scarce plants grow, as Scutellària mìnor, *H*elléborus víridis, *V*accínium Myrtíllus, *I*´nula *H*elèn*ium*, *E*pipáctis palústris, Botrýchium Lunària, &c. In the above lists I have not inserted those plants which are of common occurrence.

I should gladly have extended my list to those of secondary esteem, but from an unwillingness to trespass on your pages, to the exclusion of matter more generally important. You will observe that the names of some of the plants are repeated, being found in more than one of the above situations. You may omit the repetition, or not, as you think fit. I have included them for the benefit of the young botanist, who, seeing a plant mentioned as growing on a car, for instance, might not think of finding it in a dissimilar situation. I am, Sir, yours, &c. — *S. Appleby. St. James's Gardens, Doncaster, Aug.* 6. 1831.

P.S. Thorne Moor, Roche Abbey, and Maltby Woods abound with rare plants. These places are each about ten miles from Doncaster. At the first-named place the very rare plant Scheuchzèr*ia* palústris is to be met with in great plenty.—*S. A.*

Plants found in Yorkshire. — Sir, I send you the names of upwards of 120 species of plants, of which, except of the few starred told me by a friend, I have in one year's study ascertained the names, by the assistance of Berkenhóut's *Synopsis*, and Gray's *Natural Arrangement.* I name this, to encourage those who may deem botany a difficult and cramp study. I can assure them they will not find it so. I am learning a profession, and consequently only gathered, and ascertained the names of, my plants at my leisure hours, which are not very numerous. — *T. B. York, Dec.* 9. 1831.

Of the plants enumerated, we publish what we deem the rarer, although some of those selected are not strictly rarities. The plants starred in all were 25, including those we have starred below: and we much commend our correspondent's devotion to the subject. — *J. D.*

Verónica spicàta and officinàlis, Pinguícula vulgàris, *Erióphorum polystàchyon, *Valeriàna* officinàlis, Sanguisórba officinàlis, *G*àlium eréctum and cruciàtum, *P*lantàgo marítima, *L*ysimàchia némorum, Erythræ`a *C*entáurium, *S*ámolus Valerándi, *D*aúcus marítimus, *Œ*nánthe crocàta, Sanícula europæ`a, Hydrocótyle vulgàris, *C*ólchicum autumnàle, *R*ùmex marítimus, *A*lísma ranunculöìdes, Trientàlis europæ`a; *E*rìca *T*étralix, cinèrea, and vulgàris; *V*accínium Myrtíllus, *B*ùtomus umbellàtus, *P*olýgonum Bistórta, Saponària officinàlis flòre plèno, *O*'xalis Acetosélla, *R*anúnculus arvénsis, *T*eùcr*ium* Scorodònia, *M*éntha víridis, **B*etónica officinàlis, **P*edicularis palústris and sylvática, **A*nthýllis Vulneraria, *L*áthyrus sylvéstris, *V*ícia sylvática, *L*òtus diffùsus and màjor, *H*ypéricum púlchrum, *H*ieràcium paludòsum and muròrum, *A*chillè*a* *P*tármica, **E*'mpetrum nìgrum, Hùmulus Lùpulus, *T*àmus commùnis.

CUMBERLAND.

Castle-Rigg. — The undergiven extract, descriptive of a scene once witnessed near Castle-Rigg, has, although it may not impart much information, enough of beauty in it to merit being perused by our readers. For it we have long been indebted to our invaluable correspondent G. J. To help its intelligibleness, we may, introductorily, note from Mogg's *Paterson's Roads*, 1826, that " Castle-Rigg is contiguous to Keswick, and Keswick is situated near the lower end of that beautiful lake called Derwent Water, hence not unfrequently called

Keswick Lake [about which incidental mentions have been already made in this Magazine, Vol. IV. p. 279, and Vol. V. p. 130, 131.] About two miles south of Keswick is situated the eminence called Castle-Rigg, on the summit of which there exists a curious druidical arrangement of rude stones, some of them standing upright, others lying down, and some in an oblique position. The seclusion and sublimity of this situation are particularly well suited to the deep and wild mysteries of the druids; and the surrounding scenery, when viewed from this spot, is of an extremely grand and solemn character; Castle-Rigg being the central point of three valleys that dart immediately under it from the eye, and whose mountains form part of an amphitheatre, which is completed by those of Derwent Water on the west, and by the precipices of Skiddaw and Saddleback, close on the north. The hue which pervades all these mountains is that of dark heath or rock; they are thrown into every form and direction that fancy could suggest, and are at that distance which allows all their grandeur to prevail." The following is the extract first alluded to:—

"By this time we had nearly passed over the fell, and had begun to descend upon Castle-Rigg. The children had halted beside a rocky basin in the mountain stream, to remind me of a sight which we had once enjoyed there, and to enjoy it again in recollection. It was a flock of geese, which, in the bright sunshine of a summer's day, were sporting in that basin, and with such evident joyousness, that it was a pleasure to behold their joy. Sometimes they thrust their long necks under the water straight down, and turned up their broad yellow feet; sometimes rose half up, shaking and clapping their wings; sometimes, with retorted head, pruned themselves as they floated. Their motion did not, in the slightest degree, defile the water; for there was no soil to disturb; the stream, flowing from its mountain springs, over a bed of rock, had contracted no impurity in its course, and these birds were so delicately clean, that they could not sully it; the few feathers which they plucked, or shook off, were presently carried away by the current. It was the most beautiful scene of animal enjoyment that I ever beheld, or ever shall behold: the wildness of the spot, the soft green turf upon the bank, the beauty of that basin (and they only who have seen mountain streams in a country of clear waters, can imagine how beautiful such basins are), the colour of the stream, which acquired a chrysolite tinge from the rock over which it ran, and the dazzling whiteness of the birds, heightened by the sunshine, composed a picture which, like that of Wordsworth's Daffodils, when it has once been seen, the inward eye can re-create, but which no painter could represent. Our dear N. felt this, and regretted the impossibility of preserving any adequate representation of what he declared to be the most striking and beautiful incident he had ever the good fortune to behold. I thought of the story in Musæus's *Tales* (a fiction known to the Arabians as well as the Germans); and had they been swans, instead of geese, could almost have fancied they were fairies in that form, and have looked about for a veil." (*Southey's Sir Thomas More*, vol. i. p. 146.)

Notes on Animals about Whitehaven.—It is several years ago, since, as an amusement, I commenced butterfly-catching; but, in respect of science, I am still a mere tyro, and probably may always remain such, owing to the difficulties of arriving at a knowledge of classification and nomenclature; both of which appear to me to have been so often modelled and re-modelled, as to present to the incipient entomologist an almost insurmountable obstacle to his progress at the very outset of his career. These difficulties are artificial, and have been much increased by the multiplying of systems, which are, it seems, quite the rage with entomologists, who, instead of smoothing the way, and in order to get a name, create a system of their own, differing from all others, and consequently leading to confusion. Thus the commonest insect has, perhaps, a dozen names, and as many ways of ascertaining its species and genus. When I see it, I know what it is; but when I would know what its scientific denomination is, I am completely puzzled, and so, I dare say, are many besides myself, and for the same reason.

If entomology is ever to be made a popular study, it must be simplified, and one uniform system adopted; for no one will be at the trouble of acquiring the scientific knowledge of it, when, from the difficulties surrounding it, the overcoming of them turns recreation into toil, and toil, too, that, unless it produces pleasure, is of no use.

As it is, I am desirous of improvement, and with that view I keep what I call my entomological journal, in which I enter a note of whatever I see and what I observe of the habits of insects and animals, together with the scientific names when I can make them out. Having derived great benefit from similar kinds of notes in your excellent publication, my observations, such as they are, may have their use to others, and, if you deem them of any, you will oblige me by giving insertion to them in your Magazine. I commence with the first of last month.

April 1. 1832. The day was cold, but with occasional gleams of sunshine. For some days before, there had been hoar frost, and pretty sharp at night. The tortoise shell (Vanéssa urticæ) was observed flying about in a lively manner in the streets of Whitehaven.

5th. Took an excursion of some five and twenty miles, principally over the coal formation on the west coast of Cumberland. Observed several tadpoles [embryo frogs] in a pond, which I fancy is early. In another pond, I observed eight or ten frogs (*R*àna temporària) forming a ball, and tumbling about in the water: one had something white protruding from its mouth. They suffered me to draw them to land, when I found the white substance was part of the intestines of a female, which apparently had been squeezed out by the embraces of the male, which is much smaller than the female, and holds the latter so tightly as not to be separated without exercising considerable force. Multitudes of *G*yrìnus natàtor were gyrating about. Great numbers of various kinds of dung beetle were on the wing.

9th. The weather, unusually warm for the season, seems to have infused summer vigour into the spring swarm of Vanéss*a* urticæ: they are flying about the lanes in numbers, with much vivacity, and are remarkably shy of approach. Near Papcastle, a solitary specimen of the peacock butterfly (Vanéss*a* I'*o*) was observed; the secondary wings imperfect, but not to be captured for all that. This is singular, as I do not remember having seen one of this kind at this season of the year; certainly not for the last four or five years. On the banks of the river Derwent, near Broughton, for the first time, I observed a few of the small cabbage butterfly. Previously to this, in the neighbourhood of Whitehaven, I had seen several of the wall butterfly (Hippárchi*a* Megæ'r*a*); but they were sluggish, and easily caught. Last year, the caterpillars and chrysalis of the Vanéss*a* urticæ were uncommonly numerous: the previous year they were as remarkably scarce. This spring their colours are brilliant and rich.

14th. The weather had been chill, and caused the retreat of the insect tribe. This morning it was warmer. In the meadows, near Whitehaven, on the stump of an old oak, I saw the small brown land lizard (*L*acérta ágilis): I made an attempt to take it, but it showed me the appropriateness of its name, by darting into a whin bush as quick as lightning. I captured a *S*taphylìnus erythrópterus, so called by Leach in Samouelle's *Entomologist's Compendium.*

15th. A friend being at Fleswick, a small bay on the sea-shore, captured one of those green beetles marked with gold spots, the *C*icindèla campéstris, I believe.

16th. Having the appearance of rain, and indications favourable for fishing, I went to a small river called the Keekle, to procure some minnows for bait. Leach calls them *Leucíscus Phóxinus*. There were a great many of the fry very small. I procured a few of the larger size, full of roe, with little white nodules on the head, and the brightness of the belly discoloured, which renders them nearly useless as bait. I intend trying if stickleback (Gasterósteus aculeàtus) will answer the same purpose: our old master, Walton, says they will; and I do not see why they should not: but a noted old angler tells me they will not do in the rivers hereabouts; he has tried them, and failed to take a single fish. The minnows I placed in a large jar of water.

17th. This morning, in a small rivulet called the Poebeck, and running into Whitehaven harbour, I took a good many of the stickleback, several more than two inches long. On opening one of these, I found it full of roe; the pellets small, and of a watery consistency and colour; the brightness of the fish discoloured. Of those I caught, the greater number were little more than an inch long, and much brighter than the larger ones. I observed two of them fighting in the water; the upper one had got the under one on its side, and apparently was attempting to pierce it: whether or not it succeeded, I did not see. Your correspondent O., in his entertaining account of them (Vol. III. p. 329—332.), says they are very pugnacious. One was lying dead, probably killed in a duel. I put them into the same jar with the minnows. Not long after they had been put into their new habitation, they had eaten some worms, which their companions, the minnows, would not touch: the minnows and sticklebacks seemed to agree very well. In the same rivulet where I took them, there are no minnows; probably I may try the experiment of breeding a colony of the latter in it.

18th. Found all the larger sticklebacks dead this morning: they were females, and full of roe: the change, I suppose, has killed them; for they exhibited no appearance of injury. The smaller ones are very lively, and seem to take kindly to the change. The weather is very cold, which has kept all the insect race at home, except a few stragglers of a large kind of humble bee.

19th. Rain having fallen, I went to fish in the Ehen, or Gud, flowing from Ennerdale Lake to the sea, and was unsuccessful: obtained an excellent specimen of Necróphagus spínipes of Leach; it was floating in a mill-dam, and probably had been washed by the rain into the water, which had purified it greatly. Several years ago, I remember picking one up at St. Helen's, near Cockermouth, which gave out its smell so strongly, as to induce me to throw it away. The effluvium was exceedingly nauseous, and seemed to me to be like that given out by the weasel when irritated, but, perhaps, not quite so strong. Its fine brownish yellow transverse bands give this insect a handsome appearance, which gains for it in the case many admirers, who, if acquainted with its skunklike* properties, would turn from it with disgust. I saw several trouts which more fortunate or more skilful fishermen had caught. They were ill fed, and discoloured: they were caught with an artificial bait called roe, the roe of the salmon salted and preserved; a pellet being about the size of a swan-shot, and two or three stuck on the hook for a bait; worm they would not touch. Saw a swallow (*H*irúndo rústica *L.*) flying near Cleator: a friend tells me he saw one on the eighth of this month.

22d. Observed a great number of tadpoles in the meadows.

27th. Captured an excellent specimen of *S*taphylìnus erythrópterus. Saw Vanéss*a* I'o in excellent preservation, and very lively; also several Vanéss*æ* urtìcæ, although the day was cold, with a dry harsh easterly wind. Heard the cuckoo this evening, for the first time. In procuring some minnows as bait for trout, I observed a small species of eel fastened to a stone; some kind of lamprey. I also caught several small trout, which I put into an old limestone quarry filled with water. I intended to keep this a secret, that I might have the advantage all to myself. Notwithstanding the reputed pugnacity of the stickleback, they live very peaceably and harmoniously with the minnows; at least, I see no symptoms of disagreement: they received, as additional company, several of the lampreys.

28th. Early this morning, I was awakened by a tremendous clap of thunder, accompanied with a heavy shower of sleet. The mountain tops and higher grounds were whitened, and it was not till the middle of the day that the snow and hail melted away. Notwithstanding, I went on a piscatory expedition, but met with little or no success. About noon, some half dozen of the Vanéss*a* I`*o* were flying briskly about; their colours bright and perfect: several were on the banks of the Ehen, the small river I mentioned as flowing from Ennerdale Lake to the sea. On its banks I found a Méloe violàceus, the first I recollect having seen in this county, though I have been told they are not uncommon. Some of the lampreys are dead. There was much lightning at night.

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* The skunk is a species of weasel, and a native of America. It defends itself by the emission of an intolerable odour. A short description of it is given in Turton's translation (vol. i. p. 53.) of Linnæus's *Systèma Natùræ*, under the name of *V*ivérra mephìtis. On the margins of bogs in the United States of North America, a plant occurs, with fetid blossoms, which the Americans denominate "scunck-weed;" a starved blossom of which, as compared with those produced in the American swamps, will be found figured in Curtis's *Botanical Magazine*, t. 836.; and a copy of the same in Loudon's *Encyclopædia of Plants*, p. 88. No. 1504. This plant is the *D*racóntium fœ'tidum of Linnæus; has been called *Pòthos* fœ'tida; and more recently, by the American botanist Nuttall, Symplocárpus fœ'tidus: from *symplokē*, connection, and *karpos*, fruit, the individual berries being almost confluent. The plant is in the natural order *A*röídeæ; and the *A*'rum maculàtum *L.*, the "cuckoo pint," or "lords and ladies," of our hedge-banks, will give a near idea of it; and the *A*'rum *D*racúnculus and *A*'rum *D*racóntium of our gardens, whose blossoms effuse the odour of superlatively putrid carrion, will probably supply even an accurate semblance of the odour of the blossoms of the scunck-weed. — *J. D.*

30th. In finding the lamprey, I thought I had, like more pretending naturalists, made a grand discovery. On enquiry, I learn they are not uncommon; and, on recollection, I begin to have an indistinct idea that we are old acquaintances; a very likely circumstance, as they are easily caught, and therefore likely to become the prey of young anglers. I find they are of the genus Petromỳzon. Pennant, in his *British Zoology*, calls them the lesser lamprey; they are the Lámpetræ mèdium gènus of Willoughby and Ray; and the Petromỳzon fluviátilis of Linnæus and Fleming. [See figures of a species of Petromỳzon, viz., P. cæ`cus *Ray*, p. 23.] Here is, one might think, a number of names sufficient to give éclat to a much bigger thing than a small eel-like fish, that seldom reaches the length of ten inches, and is in general but six or seven. Those that I caught were scarcely five inches. They are tender fishes, several dying in consequence of being struck with the net; and, since their confinement, those put in along with the minnows and sticklebacks have all died. They have been caught in the small river at the head of Ennerdale Lake. I am inclined to think they are not uncommon, being to be found in all rivers, though more plentiful in some than in others. The weather is becoming very cold and unspringly, and I fear there will be nothing for the entomologist till the latter end of next month.—☞ †‡† *Whitehaven, Cumberland.*

DURHAM.

Some of the rarer Plants of Teesdale.—Sir, Having lately returned from an excursion into Teesdale, I send you a list of the rarer plants, gathered during a hurried day's journey in that rich and interesting district, which will not, I think, be unacceptable to some of your readers. I would strongly recommend to every lover of Nature, who has leisure for the investigation of her beauties, to devote a few days to this romantic alpine country; where, though much has already been done by the diligence of two able resident botanists, many further discoveries may still be expected to reward the exertions of the botanical traveller. My acquisitions are these: —

Erióphorum pubéscens
*F*estùca vivípara
*G*àlium boreàle
*G*enti*àna* vérna (April, 1831)
    campéstris
    Amarélla
Prímula farinòsa
Tofièld*ia* palústris
Epilòbium angustifòlium
    *a*lsinifòlium
*P*olýgonum vivíparum
*A'*rbutus U'va úrsi
*S*axífraga *H*írculus (Sept. 1830)
    *ai*zöìdes
*S*èdum *T*elèph*ium*
Arenària vérna
*R*ùbus saxátilis
Potentílla alpéstris
    fruticòsa
Drýas octopétala
*T*halíctrum màjus
*T*ília grandifòlia (Rokeby Park)
Bártsi*a* alpìna
*M*elampýrum sylváticum
Rhinánthus màjor
*A'*rabis hirsùta
*D*ràba incàna
*H*ypéricum dùbium
Lístera cordàta
Kobrès*ia* c*a*rícina
Aspídium *L*onchìtis
    Oreópteris
*A*splènium víride
Woódsi*a* ilvénsis
Lycopòdium alpìnum
    *s*elaginöìdes
*E*quisètum variegàtum
Gymnóstomum Doni*ànum*
Weíssi*a* nígrita
Bartràmi*a* ithyphýlla, &c.

I have in my possession specimens of the greater part of the above, which, as well as most of the rarities of Durham, &c., I would gladly exchange for the productions of Norfolk and Kent, or for those of Somersetshire, Devonshire, and Cornwall. I am, Sir, yours, &c. — *R. B. B.* 19. *Sandhill, Newcastle upon Tyne, Aug.* 15. 1831.

NORTHUMBERLAND.

A Flock of Egyptian Geese seen beside the Tweed at Carham. — In the course of last week, a flock of these rare birds denominated gansers, or Egyptian geese (*A'*nas ægyptìaca *Lin.*), were seen to visit the Tweed at Carham; two of which were shot, while nibbling grass on the margin of the river, by Ralph Stephenson, gamekeeper. These two, upon examination, were found to bear all the beautiful variegated marks which distinguish the species, more especially the broad deep chestnut-coloured spot on the middle of the breast. This beautiful bird, which was first known in our island about a century ago, is of nearly the size of the common wildgoose. It is a native of Africa, where it is found in a wild state from Egypt to the Cape of Good Hope. It is now found in several European countries, and frequently kept as an ornament on pieces of water contiguous to gentlemen's seats. One of the birds shot at Carham has been sent to Edinburgh; the other is in the hands of an ingenious person of the name of

Hood, in Coldstream, for the purpose of being stuffed. (*Newcastle Courant,* Feb. 11. 1832.)

The Dates of Appearance, Breeding, and Disappearance of some Birds and Insects, in the Parish of Tynemouth, during the Year 1831. [The systematic names affixed by our correspondent are those of Linnæus.]

Feb. 17. Skylark (*A*laúda arvénsis) began to sing. 21. Thrush (*T*úrdus mùsicus) began to sing; Blackbird (*T*úrdus *M*érula) began to sing.

April 12. Thrush (*T*úrdus mùsicus) has callow young. 18. House swallow (*H*irúndo rústica) arrived. 25. Fauvette (Sýlvia horténsis) arrived. 28. Sedge warbler (Sýlvia salicària) arrived; Whitethroat (Sýlvia cinèrea) arrived.

May 2. Corncrake (*O*rtygomètra *C*réx) arrived; Green linnet (Lóxia *C*hlòris) has eggs. 5. Early cabbage butterfly (Póntia Chariclè*a*) came out. 6. Spotted flycatcher (Muscícapa *Grísola*) arrived; Pied flycatcher (Muscícapa Atricapílla) arrived. 16. Cuckoo (*C*ùculus canòrus) arrived; Green linnet (Lóxia *C*hlòris) has callow young; Titlark (*A*laúda praténsis) has eggs; Skylark (*A*laúda arvénsis) has callow young. 17. Common tern (Stérna cantìaca) arrived.

June 12. Brown butterfly (*P*apílio Jurtìn*a*) appeared; Blue Argus butterfly (*P*apílio A'rgu*s*) appeared.

Aug. 2. Small tortoiseshell butterfly (Vanéss*a* urtìcæ) appeared. 15. Painted lady butterfly (Cýnthi*a* cárdui) appeared. 18. Copper butterfly (Lycæ'n*a* Phlæ'a*s*) appeared.

Sept. 10. Small summer birds (Muscícapæ, Sýlviæ, &c.) preparing to depart. 12. House swallows (*H*irúndo rústica) congregating previously to departure. 13. Black-throated diver (*C*olýmbus árcticus) arrives. 15. Redbreast (Sýlvia *R*ubécula) approaches the town; Admirable butterfly (Vanéss*a* Atalánt*a*) appeared. 26. Sea swallows (Stérna cantìaca &c.) departing.

Oct. 6. Black grouse (*T*étrao *T*ètrix) arrived. 20. Speckled diver (*C*olýmbus stellàtus) arrived. 22. Peewits (Trínga Vanéllus) congregating. 23. Redwing (*T*úrdus ìliacus) arrived. 27. Fieldfare (*T*úrdus pilàris) arrived; Royston crow (*C*órvus *C*órnix) arrived.

The above dates are as accurate as it is possible for them to be; since many of our birds of passage are so fatigued, on their first coming, as to render it next to impossible to ascertain the exact day on which they arrive. — *E. H. Greenhow. North Shields, Nov.* 9. 1831.

Birds of Passage visiting the Parish of Tynemouth, in Northumberland. — Sir, I send you an account of the birds of passage which visit the parish of Tynemouth, Northumberland, annually, in the summer season, for the purpose of incubation. I am, Sir, yours, &c. — *E. H. Greenhow. North Shields, Sept.* 22. 1831.

*H*irúndo rústica, House swallow.
úrbica, Martin.
ripària, Sand martin.
A'pus, Swift.
*C*ucùlus canòrus, Cuckoo.
*Y*únx Torquílla, Wryneck.

Sýlvia Atricapílla, Blackcap.
horténsis, Fauvette.
arundinàcea, Lesser Fauvette.
Locustélla, Grasshopper warbler
Hippolàis, Lesser pettichaps.
Rubícola, Stonechat.

Sýlvia salicària, Sedge warbler.
  cinèrea, Whitethroat warbler.
  Rubètra, Whinchat.
  *T*róchilus, Willow wren.
  sylvícola, Yellow wren.
*C*otúrnix màjor *Brisson*, Quail.
Lanius excùbitor, Grey or ash-loured shrike.
*M*otacílla flàva, Yellow wagtail.
Muscícapa *Grisola*, Spotted flycatcher.
Muscícapa luctuòsa, Pied flycatcher.
Ortygomètra *C*réx, Corncrake.
[Nyctichelìdon europæ'us *Rennie*], Fern owl, or goatsucker.
Stérna cantìaca [S. Boýsii Latham] Greater tern.
  minùta, Lesser tern.
  *H*irúndo, Common tern.
  Dougállii, Roseate tern.
*C*haràdrius Hiatícula, Ring dottrel.

To this list I might have added the dottrel (*C*haràdrius Morinéllus), and the redstart (Sýlvia *P*hœnicùrus); but not having met with them myself, I have thought it better to omit them.

The House Swallow (*H*irúndo rústica) is common here, as it appears to be every where. Many of the swallows in this neighbourhood congregate on the sea-banks, in search of the numerous insects with which they abound. I occasionally, during the unusually hot weather with which we have been visited this summer [1831], walked there early in the morning, that I might the more readily examine the habits of some of our summer birds of passage which more particularly frequented that place; and, among the rest, was highly gratified at seeing from fifty to a hundred swallows skimming about in all directions; and, what is truly extraordinary, in all their numerous evolutions, they never came in contact with each other; but, crossing and recrossing each other's path, they coasted along the banks, beach, and little inlets of the sea, for upwards of a mile: the beauty of which scene I cannot describe better than by the following quotation from an elegant author (Sir Humphry Davy, in his *Salmonia*, p. 79.): — "I delight in this living landscape: the swallow is one of my favourite birds, and a rival of the nightingale; for he glads my sense of seeing, as much as the other does my sense of hearing: he is the joyous prophet of the year, the harbinger of the best season; he lives a life of enjoyment, amongst the loveliest forms of nature; winter is unknown to him, and he leaves the green meadows of England, in autumn, for the myrtle and orange groves of Italy, and for the palms of Africa; he has always objects of pursuit, and his success is secure: even the beings selected for his prey are poetical, beautiful, and transient."

The Martin (*H*irúndo úrbica). Although this bird is extensively diffused over Britain, yet I am acquainted with only one of its haunts in this neighbourhood; which being three miles distant, I have fewer opportunities of examining its habits than I would wish.

Sand Martin (*Hirúndo ripària*). The localities which the sand martin prefers are not commonly met with; and although it does occasionally settle near large towns, yet it seems to be but a transient visiter, preferring solitary banks bordering upon a lake or river, where it can bring up its young undisturbed by the presence of man. A few years ago, a colony of these birds established themselves on the south side of Tynemouth banks, and seemed to increase rapidly, their nests being wholly out of reach; but, unfortunately, some idle fishermen, wishing to prove their skill upon the poor martins, shot many of them: and from that time they have never returned, but have probably emigrated to some neighbouring station, of which there are two within a few miles. I might, perhaps, with propriety, in this place, express my indignation at the merciless and too general destruction of the poor swallows; but the celebrated author of the *Journal of a Naturalist* has already (p. 221. of that work) done it in so feeling a manner as to leave nothing fresh for me to say. [See an eloquent and amiable essay "On the wanton Destruction of Swallows," in our Vol. III. p. 35., by Philochelidon.]

The Wryneck (*Yúnx Torquílla*) (*fig.* 102.) is comparatively rare here. I have seldom seen it; and never myself found its nest, although I have heard that the latter is occasionally met with. It arrives about the latter end of April.

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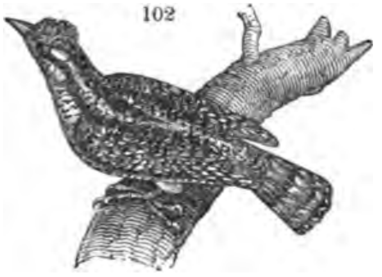

[It is but just to remark, that, beautiful as is the accompanying woodcut, it, from some nameless fault or other, does not portray the wryneck with characteristic faithfulness. I incline to say the neck and tail are too long, and these proportions represent the bird larger than it really is. The same faults, I think, appertain to the cut in Bewick's *British Birds*, from which, if I recollect rightly, the present cut has been copied. The beautiful markings are well shown; but Montagu says, "the pen or the pencil can only give a very inadequate idea of the elegant markings of this bird. Its name of wryneck seems to have been given it from the singular manner of turning its head over its shoulders alternately, at which time the black list on the back of the neck gives it a twisted appearance: it also erects all the feathers on the crown of the head in a terrific manner." Mention is made of the ryneck in this Magazine, Vol. IV. p. 450. — *J. D.*]

inchat (*Sýlvia Rubètra*). I mention this among our birds of passage, because it certainly emigrates from this neighbourhood; but is, I believe, found through the winter in Kent and some of the southern counties.

The Shrike (LàNius excùbitor) is an uncommon bird. A pair of them came this spring to a deserted and solitary plantation bordering on the town; but although I saw them daily at a little distance, yet I could not approach near enough to observe their habits, or trace them to their nest. There was a great quantity of the elytra of beetles scattered on the ground near the place which they seemed chiefly to haunt; from which I imagine these insects to have formed the principal part of their food. On going to the plantation which they frequented, on the 13th of September, I found they were gone, nor have I been able to see them since; and therefore conclude they must have already taken their departure for more genial climes.

The Pied Flycatcher (Muscícapa luctuòsa). This bird is very uncommon in Britain. A pair of them visited us this spring, on the 6th of May, and remained all the summer, until the 19th of August, when they disappeared from their breeding place; but had probably only migrated to the sea-beach, which abounds in insects at that season. This morning (Sept. 7.), while sauntering along the sea-banks, I perceived either my old friends, or some others, in company with the spotted flycatchers and other soft-billed summer birds, evidently congregating previously to the general autumnal migration. — *E. H. Greenhow. North Shields, Sept.* 22. 1831.

Several rare birds have been shot here lately, as follows: —

*L*àrus parasíticus, Arctic gull.
*Ù*pupa *È*pops, Hoopoe.
*C*oràcias gàrrula, Roller.
Falcinéllus pygmæ̀us, Pygmy curlew.

Of the first three, only one individual of each was shot: of the pygmy curlew, six were seen, all sitting together on a rock by the seaside; four of them were shot. — *E. H. G.*

Art. II. *Natural History in Scotland.*

VARIOUS COUNTIES.

Dumfriesshire. — *An Adder* (*Cóluber* Bèrus) *with two distinct Heads*, which lived three days, and formed one of six young ones taken from the body of an old adder, found in a ditch at Drumlanrig, near Dumfries, is now in the museum of Master Thomas Grierson, at his father's residence, Baitford, near Thornhill, Dumfriesshire. — *W. G. Baitford, Oct.* 8. 1831.

Fife. — *A Finner Whale taken at Largo.* — On the morning of May 15. 1832, a finner whale, 14 ft. in length, was found entangled in the stake-nets opposite the Hallhill estate, near this place. The huge animal was dragged ashore, and excited in no small degree the curiosity of the natives. (*Edinburgh Advertiser*, May 22. 1832.)

Elgin.—*The Woodcock* (Scólopax *rustícola* L.) *resides through the Year, and breeds in Scotland.* — The following communication appeared in the *Elgin Courier*, to the editor of which journal it was addressed: — "Sir, I am surprised to find that so little information exists as to the fact of the woodcock not only remaining in this part of the world, but of actually breeding every season in the forest and woodlands which surround the Earl of Moray's magnificent seat of Darnaway Castle. That such is the fact is well known, not only to the gamekeepers and woodmen, but to the forester, Mr. Cutler, who is well qualified to give to the world a very interesting account of the natural history of this northern emigrant. A friend of my own lately mentioned to me, that, during the barking season, the woodmen frequently found woodcocks' nests. He also informed me, that, in the month of April last, he accompanied the principal gamekeeper into the woods; that during their ramble they flushed a woodcock, *which flew as if wounded;* that, on his remarking this, the gamekeeper laughed, and told him it was a hen bird flying off with a young chick in her talons; and, to convince my friend of a brood being near at hand, the gamekeeper looked cautiously among the underwood, where the nest was discovered, containing two young woodcocks, which, on being disturbed, ran off, uttering a piping note. The keeper, further, gave my friend the following most interesting account of this migratory bird, which he had repeatedly witnessed. He stated, that it always builds its nest in a dry situation; that it generally has three chicks; that immediately after they are hatched, and until the chicks can fly, the cock and hen bird regularly, every morning and evening, clutch the chicks in their talons, and fly with them to the nearest springs, where they continue until the chicks have fed; when the old birds re-convey them in the same manner to their nest. He also stated, that, when the winter set in, the woodcock almost entirely deserted the Darnaway Forest; and concluded that they flew southward. I trust that some one will acquire from Mr. Macbean, the keeper at Darnaway Castle, the necessary information, to enable such person to give to the public a more perfect account of the natural history of the woodcock, than it at present possesses."

RENFREWSHIRE.

The native Animals, not Birds, of Renfrew and its Neighbourhood. —Wild animals we have as follows: —

*V*espertílio *m*urìnus, Common bat.
*E*rinàceus europæ`us, Hedgehog.
*S*òrex *A*ràneus, Common shrew.
*T*àlpa europæ`a, Mole or moudiewort: sometimes a white one occurs.
*V*úlpes vulgàris, Fox.
*M*ustèla vulgàris, Weasel, or whithret.
  putòrius, Foumart, or polecat.
*M*ús *M*úsculus, House mouse.
  sylváticus, Wood, field, or garden mouse.
  decumànus, Brown rat, ground rat
*L*èpus tímidus, Hare.
  *C*unículus, Rabbit.
Avícola agréstis, Short-tailed short-eared field mouse.

The Birds of Renfrew and its Neighbourhood. — Sir, In Vol. IV. p. 269. there is a list of the "Birds in the Neighbourhood of Renfrew." The list contains the birds only that are seen here from the 1st of November to the 1st of February; and this period of time the Rev. W. T. Bree has taken for the whole round of a year, and has misunderstood my meaning. (See his remarks, Vol. IV. p. 464.) As to the *T*úrdus mùsicus (mavis or throstle), we have them in plenty nine months of the year: in keen frosty weather they go down the country nearer to the sea, where the frost is not so severe. Pàrus caudàtus (long-tailed titmouse) is seen only about the end of November, in flocks of from seven to about twenty, busily employed cleansing our hedges of larvæ, and perhaps of benumbed insects. They do not breed in this part of the country. *T*úrdus pilàris (fieldfares) remains with us about five months: they depart in April; some years not till May. They do not breed here.

The following list contains the Linnæan names of the birds that breed with us: —

Trínga Vanéllus, Lapwing or peesweep. Nest on our poorest pastures.
*C*órvus glandulàrius, Jay. Nest on a low tree in a thicket. — *C. C*oròne, Carrion crow. Nest on a tree near a river. — *C.* frugílegus, Rook. Nest on tall trees, generally near a mansion. — *C. P*ìca, Magpie. Nest on the top of a tree, or in a high hedge, and difficult of access.
A'rdea màjor, Heron. Nest on the top of a stout and tall pine tree.
Fálco *T*innúnculus, Kestrel. Nest in a crow's or in a magpie's old nest.
Lóxia *C*hlòris, Green linnet. Nest chiefly in a Portugal laurel, or other evergreen.
*C*olúmba *P*alúmbus, Cushat. Nest on trees in our thickest plantations.
*C*érthia familiàris, Tree creeper. Nest in a hole in a tree, on in a wall.
*T*úrdus *M*érula, Blackbird. Can accommodate its nest to a variety of situations; sometimes to the inside of an outhouse. — *T.* viscívorus, Missel thrush. Nest in the cleft of a tree. — *T.* mùsicus, Mavis. Nest in a hedge or in a bush.
Anorthùra commùnis *Rennie*, Wren. Nest often under a hanging bank, among tangling roots.
Accéntor modulàris, Hedge sparrow. Nest in a low hedge.
*M*otacílla álba, Water wagtail. Nest in the thatch of a cottage.

Sýlvia *Rubécula*, Robin redbreast. Nest in ditch-banks, or a hole in a wall. — S. *Phœnicùrus*, Redstart. Nest in a wall, or a hole in the side of a tree.

Currùca salicària, Sedge warbler. Nest among reeds on the margin of a river. — *C.* cinèrea, Whitethroat. Nest in a low shrub, or in a hedge.

Sýlvia *Tróchilus*, Yellow wren. Nest on the ground among long grass, and often near a bush.

*M*otacílla *A*crédula, Willow wren. Nest on the ground, near a low bush; lined with feathers. [According to Rennie (Montagu's *Dict.*), the two last names relate to one bird.] — *M.* flàva, Yellow wagtail. Nest on the ground. These birds follow the cattle at pasture.

Pàrus màjor, Greater titmouse. Nest in the hollow of a tree, or in a wall. — P. cærùleus, Blue titmouse. Nest in a hole in a wall. — P. àter, Colemouse. Nest in holes of trees, or in a wall.

*F*ríngilla doméstica, House sparrow. Can accommodate its nest to various situations.

*P*érdix cinèrea, Partridge. Nest at the bottom of a low hedge.

*O'*tus aurìta, Horned owl. Nest in the old nest of a magpie or of a crow.

*A*laúda arvénsis, Skylark. Nest in corn fields and pastures.

*F*ringílla *S*pìza *Rennie*, Chaffinch. Nest on the branch of an apple or other low tree.

Emberìza Citrinélla, Yellowhammer. Nest in a ditch-bank. — E. *M*iliària, Common bunting. Nest on the ground, in open fields. — E. *S*chœníclus, Reed bunting or colehood. Nest often in a rush bush in marshy ground.

*H*irúndo úrbica, House martin. Nest in the upper corner of windows. — *H.* rústica, Swallow. Nest often on beams in out-houses. — *H. A'*pus, Swift. I have not seen the nest.

We do not need to go without the circuit of a mile for any of the above-mentioned birds. Many others breed in this part of the country; but I only report actual observation. Had I leisure to go a few miles farther out, many more species would be added; such as the curlew, moorfowl, sandpiper, water-crow, titling, stone and whin chat, landrail or corncrake, and some others. I forgot to mention the nest of the landrail: it is in hay fields. I have seen a dozen of young ones together; they are very like the young of the domestic hen: they are entirely black. Saw a swallow on the 10th of April: we considered its appearance early. Saw no more till the 22d of that month. Redstart came about the same time: a pair built their nest in a basket that was hanging in an out-house, and brought out five young. A large flock of wild geese passed over us by the middle of October, in a south-easterly direction: we held their early appearance to prognosticate a storm in the northern isles.

Meteorology and Vegetation of Renfrew and its Neighbourhood. — The more prominent features of the past year have been, an excellent seedtime, and a more than usual display of aurora borealis in the spring months; a warm summer, seasonably supplied with gentle showers; a plentiful and early harvest; a full swelling and ripening of buds, which bid fair for the next year's fruit; a general tenacity in the leaves of trees to retain their hold longer than usual, perhaps the effect of the first part of autumn being very dry, which may justify the remarks made by you on the orange trees of Paris, which, you say, although closely stowed into badly lighted houses in winter, yet keep their leaves well, on account of withholding water from them in September [*Gard. Mag.*, vol. vii. p. 133.]. I renounce X. Y. Z., and subscribe myself, Sir, yours, &c. — *George Duncan. Near Renfrew, Nov.* 16. 1831.

FORFARSHIRE.

Remarks during a Walk on the Coast of Forfarshire. — One beautiful morning in June, when the rising sun had tinged the green hills with refulgent gold, and lit up the clear waters of the Tay with sparkling brilliancy, I left Dundee, and proceeded along the margin of the river on the road leading to Broughty. The morning was extremely pleasant, the flowers breathed their sweetest incense, the trees were apparelled in richest verdure, a thousand warbling minstrels mingled their melodies in a matin hymn, and I went on my way rejoicing. Before entering the village of Broughty, there is on the beach a ridge of rocks denominated the Hare Craigs, which presents the botanical amateur with several interesting objects. The beautiful Diánthus deltöìdes, the Erythræ'a *C*entaúrium, *S*èdum ánglicum, *S*piræ'a Filipéndula, and the pretty little Teesdàl*ia* nudicaúlis, are here in abundance; and in the crevices of the rocks may be found *A*splènium *A*diántum nìgrum and *T*richómanes. The descent from these rocks led me into the populous village of Broughty, which exhibited a gay and animated spectacle, from the crowds of emigrants that had resorted hither from all parts of the country, to breathe the salubrious air, and bathe their limbs in the invigorating waters of Tay. Two miles farther onward, I came to Monifieth, and culled specimens of *S*isýmbrium Sophìa, *A*nchùsa sempervìrens, *M*álva rotundifòlia, and *C*árduus Mariàn*us*, which luxuriantly decorated the waysides. I now entered upon that extensive tract of sandy downs called the Sands of Barrie, which is a rich field for the lover of nature. A ramble on these downs, though fraught with all the inconveniences of desert-travelling, as heat, thirst, and fatigue, will yet amply remunerate him for his toils. Here he will meet with that singular plant *E*rýngium marítimum; and, in profusion, *E*rígeron àcris, Genti*àna* Amarélla, Eròdium *c*icutàrium, Salsòla *Kàli*, Cochleària officinàlis and ánglica, *S*àlix rèpens and argéntea, with many other willows; and, in moist places, Spérgula nodòsa, *P*arnássia palústris, and *A*lisma *r*anunculöides. *E*quisètum variegàtum, Sagìna marítima, and Ophioglóssum vulgàtum are said to be also found on these sands: but they have as yet escaped my research. Among the myriads of splendid insects that embellish this desert scene, I might enumerate the admirable butterfly (Vanéssa Atalánta), the tortoise-shell butterfly (Polychlòros urticæ), the great silver-spot fritillary (Argýnnis Aglàia), the copper butterfly (*P*apilio Phlæ'as), many beautiful Coccinéllæ, Scarabæ'i, *M*úscæ, *A*rà-neæ, &c. I observed one large specimen of the *A*ránea diadèma [Epeira diadèma], which had entangled in its web a full-sized Polychlòros urticæ. Leaving these downs, and passing the villages of Carnoustie, West and East Haven, I advanced towards the royal burgh of Aberbrothwick, at which place I arrived before sunset. Next morning, when the glory of Sol was gleaming from the calm breast of the ocean, and the lark trilling his gladsome song in the sky, I resumed my journey, accompanied by a friend, who volunteered to escort me a mile or two to the eastward, and direct my attention to the most remarkable features of the rugged coast. With enthusiastic delight I contemplated the wild and romantic scenery along the shore, which, for picturesque grandeur and sublimity, far exceeded my warmest anticipations. The vast towering cliffs, the dreadful ravines, gloomy caverns, and subterranean passages, with the waves foaming, dashing, and roaring in their bottoms, filled the mind with emotions of terror, blended with wonder and admiration. We called at a cottage near the Masons' Cove, one of the most remarkable of those excavations in the rocks called the *coves*; and, after partaking of some refreshment, visited this natural curiosity, attended by a curly-haired girl bearing tinder and a lamp. This grotto, which is of considerable extent, derives its name from being occasionally used by the "free and accepted masons" in lieu of a festive hall. With our light we explored its dark recesses, and drank from a cool spring that issues from a limestone rock near the inner extremity. Another of these coves is called the Forbidden Cove (forbidden to us only from its inaccessibility without a boat), of which Tradition has her tale. A piper, says she, once had the hardihood to enter this dreadful cavern, but paid dearly for his temerity; for he was never again permitted to breathe the pure air, nor enjoy the cheering sunshine of heaven. He had taken his bagpipes along with him, playing a "merry rant," to keep himself from bei [illegible] he paced its midnight darkness; and his instr [illegible] r the last time, about a mile up the cov [illegible] ts convened around their fire-side. From that day to this, the unfortunate piper's fate is a mystery. There are also the Gypsies's Cove, Dinmont's Cove, the Devil's Blowpipe, the Lady's Cove, and many more for which I heard no names. These rocks are covered with various maritime grasses, intermingled with a profusion of flowers; chiefly *L*òtus corniculàtus, *S*tátice Armèria, *G*erànium sanguíneum, *V*ícia sylvática, *H*eraclè*um* *S*phondýlium, Pimpinélla *S*axífraga, *S*olànum Dulcamàra, Parietària officinàlis, *S*colopéndrium vulgàre, and Silène marítima.

I separated from my friend at a spot called Seaton Den, the declivities of which were richly embroidered with the blossoms of *L*ýchnis diúrna, *G*èum rivàle, and *Valeriàna* officinàlis. My attention was then directed to a singular scene, called the Gaylet Pot of Auchmithie. This is a large deep cavity in the middle of a field, into the bottom of which the foaming waves of the ocean have found ingress by a grand subterraneous passage, scooped out by the hand of nature through a mass of rocks about 300 ft. in thickness. A field in the vicinity of this curious place presented me with the rare *H*ypéricum humifùsum, associated with Ceràstium viscòsum, and *A*nagállis arvénsis; the adjacent rocks were lavishly adorned with Diánthus deltöìdes, *A*strágalus glycyphýllos and hypoglóttis; and, in the dens, there was abundance of Campánula glomeràta, *L*ìnum cathárticum, and A'juga réptans. I passed through the fishing village of Auchmithie, and, about noon, reached that stupendous promontory called the Red Head. It is situated on the west side of Lunan Bay, rises 250 ft. perpendicular to the sea, and forms part of a bed of fine red sandstone which runs through the Valley of Strathmore. I cautiously approached the brink of this frightful precipice, and ventured to look over; but a sensation of terror thrilled through every nerve, and I exclaimed with Shakspeare —

> " How fearful 'tis to cast one's eyes so low!
> The crows, and choughs, that wing the midway air,
> Show scarce so gross as beetles. . .
> . . . The murm'ring surge,
> That on the unnumber'd idle pebbles chafes,
> Cannot be heard so high: — I'll look no more;
> Lest my brain turn, and the deficient sight
> Topple down headlong."

Innumerable flocks of gulls and other sea-birds have taken up their abode here; and by their variety of motions, and continued clamour, give animation to the rude scene. Around the venerable ruins of Red Castle, the sandy shore of Lunan Bay is covered with Psámma arenària; among the majestic culms of which, long-tailed titmice (Pàrus caudàtus) were sporting in considerable numbers. The rocks to the eastward of this bay do not partake so largely of the wildness which characterises those I had passed; but they possess an aspect of boldness and grandeur which commands admiration. They are adorned with most of the plants already enumerated, besides abundance of Agrimònia *E*upatòr*ia* and Silène nùtans. Following their windings with a joyous step and a delighted eye, I reached Montrose just as the sun was smiling adieu to the landscape, and the blackbird breathing his mellow effusions into the ear of departing day. — *William Gardiner, junior. Dundee, Jan.* 18. 1832.

Art. III. *Natural History in Ireland.*

VARIOUS COUNTIES.

Rarer Birds taken in Ireland, principally in the Vicinity of Dublin, in the Winter of 1831–2. — Sir, In relation to the title of this article, I may first mention the dun-diver; my description of the trachea and other characteristics of which you have inserted under Queries (p. 397.), for the purpose of acquiring the specific name of my particular specimen from some competent ornithologist. Besides this were the following: — Two of the great northern diver (*C*ol*ý*mbus glaciàlis *L.*). The first is a female, and answers to the description in *Montagu:* it had been preserved before I saw it. The other was brought to me (Jan. 10. 1832), and proved to be a male: it weighed 10 lbs. 2 oz.: length, 2 ft. 8 in.; breadth, 4 ft. 6 in.: length of bill to the forehead, 3½ in.; to the corner of the mouth, 5 in.: the upper edge of the bill dusky, the under light-coloured: there are no bands on the neck, as in the mature male, nor are the spots at all numerous; they are scattered over the wing coverts and scapulars very sparingly, and are generally of an oval shape. I imagine that it is in its second plumage; and, from its great weight, would probably have attained its mature plumage in July: it is considerably larger than the female: they were both shot, I believe, in Lambay. A crested cormorant (*P*halacrócorax cristàtus *Cuvier*) was brought to me on Jan. 24. 1832: for further facts on it, see Queries (p. 397.). The grey phalarope (Phalàropus platyrhýnchus *Tem.*) was shot in Dublin Bay last Nov. [1831]. Three of the fork-tailed petrels (Thalassídroma Leách*ii*) were lately taken; two of them were sent from the north of Ireland, the other was taken alive at sea, but died for want of proper food; it is now in the museum of the Dublin Society. A white-fronted goose (*A*'nas álbifrons) was bought at a poulterer's in this city, during the present month. — *T. K.* *Dublin, Feb.* 7. 1832.

Water-flight of Glencar. — At Glencar, in the vicinity of Sligo, is a waterfall, which, when the wind blows from a particular point, is beat back; forms a kind of water-spout; and falls at a distance, like the drizzling shower of a summer's eve. — *J. R.* *Lee, Kent.*

List of Rare Birds killed near Belfast. — *Great Northern Diver.* A very fine specimen of this bird was killed in Belfast harbour, April 26. 1831, a male, in full plumage, weight upwards of 12 lbs. Two others were seen at the same time. I watched two of these birds, one morning, when they were only at the distance of 50 yards from the shore. I could distinguish the spots on the back, and the rings round the neck. They dived and sported about for a considerable time, occasionally uttering a peculiar booming cry; and, after remaining for some time, swam out to sea. I procured two of these birds on Larne Lough, on Dec. 25. 1830. The one, apparently in first year's plumage, weighed only 6¾ lbs., and agreed with Bewick's lesser imber: the other, in second year's plumage, weighed 10 lbs., having only a few white spots on the scapulars and tail, and the plumage very light. I have seen one shot on Lough Neagh, Sept. 10. 1831, which had in all probability been wounded during the past winter. — *Black Guillemot.* I procured two: one shot Dec. 4. 1831, and the other Jan. 8. 1831; also a young bird, Aug. 26. 1831. These birds have been met with, both summer and winter, at the entrance to Belfast Harbour, near the rocks, where the common guillemot and others breed; and although I have never seen the egg, I am confident they must breed here. — *Sanderling.* Shot Sept. 1830. Very rare here. — *Grey Plover.* Oct. 1830. — *Lesser Redpole.* — *Tippet Grebe.* Very rare in the north of Ireland. — *Dusky Grebe.* Also rare. — *Black-headed Gull,* in winter plumage, in which state it is the red-legged gull of Bewick. — *Speckled Diver.* I procured four specimens of this bird, all different in plumage: one of them agreed, in the form of the beak, with the black-throated diver (by Mr. Selby's plate), and was different in other respects from the three others, which I conceive to be the red-throated diver in young or immature plumage. The first, I think, is, in all probability, the young black-throated diver. — *Red Godwit.* Killed Aug. 1831. — *Pygmy Curlew.* Three, shot Sept. 6. 1831. — *Least Sandpiper,* or *Stint.* This very rare little bird was shot here Sept. 1831. It agreed with the description of one in Montagu's *Dictionary.* — *J. D. M.* *Belfast, Sept.* 22. 1831.

Belfast Museum. — A meeting of the Natural History Society was held on March 28., when a paper was read, containing notices of some rare birds lately killed in the vicinity of Belfast, specimens of which were exhibited. The birds were: — The Rough-legged falcon (Fálco *Lagòpus Linn.*), pygmy sandpiper (Trínga subarquàta *Temm.*), little sandpiper (Trínga minùta *Temm.*), ruff (Trínga púgnax *Linn.*), spotted redshank (*Tótanus* fúscus *Leisler*), grey phalarope (Phalároopus platyrhýncus *Temm.*), gannet (variety of *Súla* álba *Meyer*). The reader stated that he believed three of these birds, the rough-legged falcon, little sandpiper, and spotted redshank, were new to the Irish fauna, not having occurred to the late Mr. Templeton; and that the pygmy sandpiper, which is rare to English and Continental naturalists, is not so here. Montagu, in the supplement to his *Ornithological Dictionary*, published in the year 1813, mentioned that he had not heard of the ruff being found so far west as Ireland; and Mr. Rennie, in his late edition of the same work, published last year, has repeated the passage, without comment. That the range of these birds is wider than either of these authors supposed, is manifest from the fact, that several specimens of the ruff have been taken in this neighbourhood during the last twelve years. (*Northern Whig*, March 29. 1832.)

DONEGAL.

A List of, and Remarks on, some of the Mammalious Animals, and the Birds, met with in the Three Years preceding December 4. 1828, *on the Northern Coast of Donegal.* By John V. Stewart, Esq., of Ards House. — From the remarks prefixed to the list, we learn that our correspondent's observation had been confined almost entirely to the parish in which he resides, and been extended only over a period of three years. Had greater space and time been included, a richer catalogue of species might have been presented, and other departments of the animal kingdom included, which are here omitted. He considers that the coast of Donegal has been but little or not at all explored; and that it is very likely indeed to prove a fruitful field to the exploring naturalist. From its northern situation, and the diversified nature of its coast and soil, he deems it an especially eligible situation for investigating birds, and becoming acquainted with the migratory habits and change of plumage of many species. Our author has the following introductory remarks to his list: —

I have, in the following list, given Temminck's classes, but adhered to the names of Linnæus, and added to them the English names of Bewick, as, from the exactness of his plates and descriptions (in his *British Birds*) the most inexperienced can have little difficulty in recognising any bird. I have included between brackets those which I think have been improperly considered distinct, accompanying them, in many instances, with notes; and I have less hesitation in advancing these opinions, as I find nearly all of them are in unison with those of Temminck, Montagu, and Edmonstone, though formed before I had the pleasure and advantage of perusing their writings.

Explanation of Abbreviations.

re. resident.	c. common.
s. p. spring bird of passage.	ra. rare.
a. p. autumnal bird of passage.	v. r. very rare.
a. v. accidental visiter.	

MAMMA'LIA.

Vespertílio aurìtus, Long-eared bat.
    murìnus, Short-eared bat.
Phòca vitulìna, Seal.
Cànis Vúlpes, Fox.
Fèlis Càttus, Wild cat.
Mustèla Lùtra, Otter.
    Màrtes, Yellow-breasted marten.
    ermínea, Stoat.
    vulgàris, Weasel.
U'rsus Mèles, Badger.
Sòrex Arànеus, Shrew mouse.
Erinàceus europæ'us, Hedgehog.
Mús Ráttus, Rat.
    Músculus, Mouse.
    sylváticus, Long-tailed field m.
    amphíbius, Water rat.
Lèpus tímidus, Hare.
    Cunículus, Rabbit.
        Black variety [Wild ?].
        Fox-coloured variety.
Balæ'na Mysticètus, Common whale.
Physèter, Cachalot. *
Delphìnus Phocæ'na, Porpoise.

A'VES.

Rapàces.

Fálco lanàrius, Lanner, re, ra †
    peregrìnus, Peregrine falcon, re, ra
    Subbùteo, Hobby, a.v, v.r
F. *Æ'salon*, Merlin, a.p, c ‡
    Tinnúnculus, Kestrel, re, c
    Chrysæ'etos, Golden eagle, re, ra §

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* In following the arrangement of Linnæus in the class Mammàlia, I have been forced to place this animal under *Physèter*, from its teeth being confined to the lower jaw, though it does not agree in any other respect with the varieties mentioned under that head: in its general character and appearance it much more nearly approaches *Delphìnus*; and I am disposed to consider it a non-descript of that genus.

† Fálco lanàrius and peregrìnus. Temminck adheres to the opinion, that peregrìnus and lanàrius are distinct: they are both rare here, and I have, therefore, had little opportunity of investigating as to their identity. If they are the same, lanàrius must be the mature bird, as I got three young ones out of two different nests, full fledged, and very nearly in the perfect plumage of peregrìnus: they unfortunately died after a short time.

‡ Fálco *Æ'salon* generally visits us the first week in October; I have, however, met with it occasionally in summer: the males, improperly called Lithofàlco, are generally more numerous than the females; a circumstance I am at a loss to account for.

§ I have not yet been able to ascertain any of the ring-tailed eagles in this county, though I have reason to think I have seen them: I can, therefore, as yet, give no opinion as to the identity of this and the golden eagle.

F. Albicílla, White-tailed eagle, re, c*
*O*ssífragus, Sea eagle, re, c

F. *N*ìsus, Sparrowhawk, re, c
*B*ùteo, Buzzard, re, c

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* Eagles in the plumage of Albicílla and *O*ssífragus are very common here; and, from this circumstance, I have had many opportunities of observing them in a wild state, and watching them in confinement: the result of this has been, a conviction in my mind that they are the same bird at different ages. I have been fortunate enough, through the kindness of my friends, to procure three for my museum; and, as they show the gradual change from *O*ssífragus to Albicílla, I will shortly allude to them all. The first, a young female (I should suppose in its third year, from its similarity to one I have in confinement), is in what is described as the perfect plumage of *O*ssífragus, having the blue bill, brown iris, dark-coloured neck and back, and brownish black tail speckled with dirty white, of that bird. The second, a large female, 14 lbs. weight, I suppose in its fourth or fifth year, has the fine yellow bill and pale yellow iris of Albicílla, with the plumage the same as *O*ssífragus, except the tail, which, from the predominant distribution of white in it, though still mottled with brown, renders it proper that it should be referred to Albicílla. I am sure, from the mode in which the white is distributed, in large patches, on the tail, that it would, at its next moult, have got the white tail of Albicílla, and probably, the year after, the cinereous neck and back, which would then make it the perfect white-tailed eagle. It thus forms the connecting link between the first and third, which is an old male, with the yellow beak, pale yellow iris, cinereous neck, breast and back shaded with pale brown, pure white tail, and perfect plumage of Albicílla: I have also procured five young ones from the nest, and of these I have two in confinement. One of these, a male (now in its third year), taken from a nest attended by two white-tailed eagles, still preserves the plumage of *O*ssífragus, with the blue bill, brown iris, and brownish tail of that bird, though I can, this year, perceive a slight approach, in the two former particulars, to yellow, and, in the latter, to white. The other, now in its second year, and which, from its much larger size, I conclude is a female, was also taken from an eyry attended by two white-tailed eagles, and is also in the plumage of *O*ssífragus, differing only from the other, at its corresponding age, in having the feathers on the back much lighter; arising, probably, from sexual difference, or from its having been more exposed to the weather. I also saw, this year, one of two young ones taken from a nest in the full plumage of *O*ssífragus; and as the male bird was caught in a trap, attending this nest, and is the one described above in the perfect plumage of Albicílla (now in my collection), I think the most sceptical can have little doubt of *O*ssífragus being the immature offspring of Albicílla. I have been thus particular on this subject, as, from the numbers here, I enjoy opportunities of investigation which fall to the lot of but few; and which I have, therefore, been anxious to take advantage of, particularly so, as it is a question which has been so long discussed by many eminent and zealous naturalists, among whom I am happy to find the illustrious names of Cuvier and Temminck according with my opinions. The male bird is always much the smaller, and is the lesser white-tailed eagle of Latham. In spring, I have seen the white-tailed eagle apparently paired with *O*ssífragus; and I have reason to believe that they breed together, a circumstance well calculated to prove their identity. The males, at this season, are very assiduous in their attentions to the females, and very pugnacious in their rivalry to enjoy their regards. Some time ago, two of them, near this, fought so furiously for a female, who remained soaring above them, that having, in the contest, fixed their talons firmly into each other's breasts, they dropped to the ground, and there continued their struggle so fiercely, that a peasant passing by was enabled to

F. æruginòsus, Moor buzz., a. v, v. r
Strìx strídula, Tawny owl, re, ra
flámmea, White owl, re, c
S. Bùbo, Great-eared owl, a.v, v.r*
O'tus, Long-eared owl, re, ra

Omnívores.

Córvus Còrax, Raven, re, c
Córnix, Crow, re, c
frugílegus, Rook, re, c
Monédula, Jackdaw, re, c
C. Pìca, Magpie, re, c
Gráculus, Red-legged crow, re, c
Stúrnus vulgàris, Starling, c

Insectívores.

Túrdus viscívorus, Missel thrush, re, c †
pilàris, Fieldfare, a.p, c
mùsicus, Throstle, re, c
ìlìacus, Redwing, a.p, c
torquàtus, Ring ouzel, re, c
T. Mérula, Black ouzel, re, c
Stérna Cínclus, Water ouzel, re, c
Motacílla, Reed fauvette, s.p, c ‡
Sýlvia, Whitethroat, s.p, c
Rubécula, Redbreast, re, c
Tróchilus, Willow wren, s.p, c §

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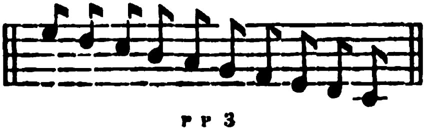
despatch them both with his stick: thus valiantly rather yielding their lives, than the prize for which they were contending; a bravery worthy of a better fate.

* Four of these birds paid us a visit for two days, after a great storm from the north, when the ground was covered with snow: they have not since been seen here. As I am informed that a pair of them breed in Tory Island, about nine miles to the north of this coast, it is probable that they came from that island. I have heard of them nowhere else.

† These birds, on the approach of autumn, get into flocks of from 15 to 20: till within the last few years they were entirely unknown in this part of Ireland, where the misseltoe (Víscum álbum *L.*) does not grow. The young differ much in the plumage from the old.

‡ Bec-fin, phragmite of Temminck, and sedge-warbler of Latham, not Motacílla salicària of Linnæus, to which, by Bewick and other authors, it has been improperly referred, and to which, with Temminck, I think it does not bear the least resemblance. I have searched in vain for it in Dr. Turton's edition of Linnæus's *Systèma Natùræ*, the only one to which I have had an opportunity of referring; and I am therefore disposed to think that it has been unnoticed by the great father of natural history. It is common in this country; one of the latest of our spring visitants, and certainly one of the most interesting in its manners, though, from its shy habits and constant restlessness, it is difficult of access; and, from the unceasing variety of its borrowed song, and its retirement, it is often passed unnoticed. Often have I been so deceived by its imitative strain, that, on its assuming the clear note of the thrush, the harsh twitter of the sparrow, or the vocal power of some other songster, I have given up my pursuit of it, supposing it must have stolen off in a different direction, and have only been undeceived when it has had recourse to its natural harsh and chiding oft repeated note. Frequently it rises above the brake in which, perhaps concealed, his helpmate is assiduously attending to the duties of incubation, and beguiles her of her weary hours, by imitating the lark, both in its melodious strains and its gestures.

§ In vain I have searched in this country for the three varieties of this bird described by White in his *Natural History of Selborne;* nor have I ever met with it in England or Scotland. Its song, if deserving of that name, has never been properly described in our works on natural history. It consists of whistling notes, which it runs through the gamut of B; thus:—



M. **Régulus**, Golden-crested wren, re, c
Troglódytes, wren, re, c
Œnánthe, White rump, s p, c *
Rubètra, Whinchat, s.p, c
Rubícola, Stonechat, re, c
M. modulàris, Winter fauvette, re, c
álba, Pied wagtail, re, c
Boárula, Grey wagtail, re, c
flàva, Yellow wagtail, re, c
*A*laúda praténsis, Titlark, re, c †
campéstris, Field lark, re, c

Granivores.

*A*laúda arvénsis, Skylark, re, c
Pàrus màjor, Greater titmouse, s.p, c
àter, Cole titmouse, re, ra
cærùleus, Blue titmouse, re, c
caudàtus, Long-tailed titmouse, re, v.r
Emberìza Citrinélla, Yellow bunting, re, c
E. *M*iliària, Bunting, re, c
*S*chœnículus, Black-headed Bunting, re, c
nivàlis, Snow bunting, a.v, ra
Lóxia *Pyrrhùla*, Bullfinch, re, ra
Coccothraústes, Grosbeak, a.v, v.r, ‡
*C*hlòris, Green grosbeak, s.p, c

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comprising ten notes: the latter ones are very soft, and run into each other: and though it would thus appear anxious to be well grounded in the principles of music, by thoroughly and constantly practising the gamut, like a true musician, yet it never arrives at greater musical perfection; and its notes, though soft and melodious, are not sufficiently diversified to merit the name of song.

* The old wheatears, which are among our first spring visitants, take their departure from this place soon after the young ones can provide for themselves: this may account for what White mentions, their being found about this period, in great numbers, on the downs in Sussex, where, until then, they are scarcely met with. The young ones which remain a month or six weeks longer, are very different from the old ones, at this age, in their plumage.

† Temminck, under pipit, very properly separates praténsis and campéstris from the family *A*laúda of Linnæus, under which they should never have been ranked; as, in their habits, food, and form of bill, they much more nearly approach the wagtail. According to this arrangement, they form a very natural link of connection between *M*otacílla and *A*laúda, to the latter of which, in some points, they bear a resemblance.

‡ I shot a pair of these birds a few days ago, in fine plumage; the first instance, I believe, of their occurring in Ireland. Their strength of beak as compared with the size of the bird, is quite wonderful: it results from very strong and large muscles, which, extending on either side from the eye to the occiput [hind-head], reach from the lower mandible to the top of the cranium, where they meet; they are separated from the eyes by deep bony ridges, to which they are firmly attached. By contracting these muscles, which are thus so firmly attached to the skull, it exerts such a force as enables it to crack, with its hard and strong bill, the thick stone of the hawthorn berry, an operation requiring a strong exertion of the human jaw. On dissection, I found one of these stones thus cracked in one of their stomachs, with the fresh kernel still in one half of the shell. A few hours after they were dead, I took a strong pair of scissors and a knife, using them as levers to force open their bills, and found the muscles had so firmly contracted, that, to effect my purpose, I had to use a wedge; a forcible proof, it will be allowed, of their strength. Their bills alone, however, are formed as a pair of *nut-crackers*, as the muscles of the neck, unlike those of the woodpeckers, are not strong. Not so with the wings, which are furnished with such strong muscles, that they could almost vie with the pigeon in strength and rapidity of flight. They would, therefore, unlike many of our birds of passage, be well calculated for distant migrations.

Fríngilla doméstica, House sparrow, re, c *
cœ'lebs, Chaffinch, re, c
F. Linòta, Grey linnet, re, c
linària, Lesser redpole, s.p, c
Carduèlis, Goldfinch, re, c

Zygodáctyli.

Cùculus canòrus, Cuckoo, s.p, c

Anisodáctyli.

Cérthia familiàris, Creeper, re, v.r

Alcỳones.

Alcèdo I'spida, Kingfisher, a.v, v.r.

Chelidones.

Hirúndo rústica, Chimney swallow, s.p, c
úrbica, Martin, s.p, c
ripària, Sand martin, s.p, c
H. A'pus, Swift, s.p, ra
Caprimúlgus europæ'us, Nightjar, s.p, c

Colúmbæ.

Colúmba Palúmbus, Ring dove, re, c
C. Túrtur, Turtle dove, a.v, v.r

Gallinæ.

Phasiànus cólchicus, Pheasant, a.v, r
Tétrao scóticus, Red grouse, re, c
T. Pérdix, Partridge, re, c
Cotúrnix, Com. quail, a.v, v.r

Grallatòres.

Charàdrius Cálidris, Sanderling, v.r
Hæmátopus ostrálegus, Oyster catcher, re, c
Charàdrius pluviàlis, Golden plover, re, c
Hiatícula, Ring dottrel, re, c
Trínga Vanéllus, Lapwing, s.p, c
intérpres, Turnstone, re, c }
Morinélla, Turnstone, re, c }
A'rdea màjor, Heron, re, c
A. stellàris, Bittern, re, v.r †
Scólopax arquàta, Curlew, re, c
Phæ'opus, Whimbrel, s.p, c
Trínga alpìna, Dunlin, s.p, c
Cínclus, Purre, a.p, c ‡
marítima, Purple sandpiper of Montagu, re, c
cinèrea, Ash-colrd. Sandp., v.r
Scólopax Cálidris, Redshank, re, c
leucophæ'a, Godwit, re, c §

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* I have had a milk-white sparrow in confinement for two years: it was taken from the nest, is very sprightly, and a female. At its moults there has been no change in the colour of its plumage: it has got the eyes of all albinoes.

† I am informed that bitterns were very common in this country thirty years ago: from increased cultivation and population they are now, however, very rarely met with.

‡ Notwithstanding the opinion of Temminck and Montagu, I am still inclined to consider the purre and dunlin distinct. I have always found the former with a longer bill and larger body than the latter; and though this may arise from a difference of age, which, I have always found, has a material effect in both these respects, yet, as I have never met with them in a state of change from one to the other, although both are very numerous here at different seasons, I hesitate to adopt their opinions, though the former has done more than any of his predecessors, by judicious distinction, to elucidate this family, which is involved in much confusion.

§ Of the godwits, or family of Limosa, Temminck mentions only two varieties; malinùra having the bill straight; and rùfa, having it curved upwards. There are, however, two varieties, both of them common in this country, having the latter character of bill, leucophæ'a of Linnæus (improperly, by Bewick, called Ægocéphala of that author), and canéscens of Linnæus and Montagu: of these, the latter is so much smaller, so much shorter in the bill, and has so different a cry from the common godwit, that there can be no doubt of the propriety of including these three varieties in the family Limòsa.

S. canéscens, Cinereous godwit, re, c
rustícola, Woodcock, a.p, c
Gallinàgo, Common snipe, a.p, c
Gallínula, Judcock, re, c
Rállus aquáticus, Water rail, a.p, ra
*C*réx, Landrail, s.p, c
*F*ùlica chlóropus, Com. gallinule, re, c

Pinnatipedes.

*F*ùlica àtra, Coot, s.p, ra
*C*olýmbus mìnor, Little grebe, re, c

Palmipedes.

Stérna *H*irúndo, Common tern, s.p, c
minùta, Lesser tern, s.p, c
*L*àrus glaúcus, Burgomaster, re, ra
marìnus, Black-backed gull, re, c
argentàtus of Montagu, Lesser black-backed gull, re, c
fúscus, Herring gull, re, c
cànus, Common gull, re, c
tridáctylus, Kittiwake, s.p, c
Rissa, Tarrock gull, s.p, c
ridibúndus, Black-h. gull, re, c*
Brown-headed gull,
cineràrius, La petite mouette cendrée of Brisson, re, c
erýthropus, Brown gull, re, c
parasíticus, Arctic gull, re, ra†
crepidàtus, Black-toed gull, re, ra
Procellària pelágica, Stormy petrel, s.p, c‡
A'nas *A*'nser, fèrus, Greylag goose, a.p, c
erýthropus, Bernacle, a.p, ra
Bérnicla, Brent goose, a.p, c
*C*ýgnus fèrus, Wild swan, a.p, c
Tadórna, Sheldrake, s.p, c
*B*óschas, Mallard, re, c
*P*enélope, Wigeon, a.p, c
*C*récca, Teal, re, c
glaciàlis, Long-tailed duck, a.p, v.r §
Marìla, Scaup duck, a.p, ra
ferìna, Pochard, a.p, ra
Clángula, Golden eye, a.p, c ||
*G*laúcion, Morillion, a.p, c

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* This, and the three succeeding, are the four states of plumage of the black-headed gull. The first is the mature bird in the plumage of summer; the second is that state of it when the black on the head has, in autumn, faded into brown; the third, of which there is a particularly good representation in Bewick's *British Birds*, is the bird in its winter plumage, when, in great numbers, they follow the plough; and the fourth is the plumage of the young bird. I have killed them in all these stages, and in all the intermediate ones, at periods when, from moult, the change from one to the other was quite apparent. The soft tuft of white feathers on the lower eyebrow may be safely taken as a distinguishing characteristic in all these.

† The arctic gull seldom approaches the shore. I cannot, therefore, ascertain whether it ever breeds here or not, where, indeed, it is a rare bird. I lately got a specimen of *L*àrus crepidàtus, which, from having the two middle tail feathers considerably longer than the others, induces me to consider it identical with parasíticus, of which it has long been supposed to be the young. Much remains yet to be discovered respecting the gulls. I am certain, on further investigation, the number of species will be diminished.

‡ These birds breed in great numbers in Tory Island, in the rabbits' holes, like the puffins; from which circumstance, I have been able to get numbers of them alive: they scarcely ever approach the mainland.

§ I got a specimen of *A*'nas glaciàlis a few days since; it is the first I have met with in this country: though with nearly the perfect plumage of the female, and without the long tail feathers, it proved, on dissection, to be a male: it must, therefore, be a bird of this year.

|| That *A*'nas *G*laúcion is the female and immature male of *A*'nas Clángula cannot be doubted: I have killed them paired with the golden eye, and have constantly seen them mixed with them in winter. The mistake of supposing them distinct has arisen from some of them, on dissection, proving to be males; a circumstance which never ought to have any weight in this species, or in those in which the males are known, in their immature stages, to have the plumage of the females.

A. Fulígula, Tufted duck, a.p, ra
Mérgus serrator, Red-breasted merganser, a.p, c
Pelecànus Cárbo, Corvorant, re, c
Crested corvorant, re, c
Gráculus, Shag, re, c
cristàtus, Crested shag, re, ra
P. Bassànus, Gannet, a.v, ra
Colýmbus glaciàlis, Northern diver, a.p, ra *
I'mmer, Imber, a.p, c
septentrionàlis, Red-throated diver, a.p, v.r †
stellàtus, Speckled diver, a.p, c

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* From *Colýmbus* glaciàlis and *I'mmer* being very common in this country, where they arrive the first week in October, I have had good opportunities of observing them; and in doing so have found the telescope a valuable assistant, as it has enabled me to watch them much more closely than I could otherwise have done, from their quick sight and consequent shyness; indeed, it will be found at all times a useful accompaniment by the ornithologist. [See other mentions of its application, Vol. IV. pp. 145. 450. 464.; Vol. V. pp. 83. 205. 380. 396.] But to return. The result of my observations on glaciàlis and *I'mmer* has been a conviction in my mind of their being the same bird in different states of plumage. I have every season been able to procure a number of specimens of them both; and have thus been enabled, from them, to select for my museum an uninterrupted succession, proving, by almost imperceptible changes, the transition from *I'mmer* to glaciàlis: the former of these, in the early part of their residence here, is much the more common; but towards the end of spring, when they leave this country, the number of the latter is greatly increased; and though, even at that period, they have not attained the perfect plumage of that bird, yet, the completion of the white spots on the back, and the black bands on the neck though not yet quite perfect, are sufficient to characterise the bird in such a manner that it cannot be mistaken. These birds appear to vary much in size and weight: they generally measure, from the tip of the beak to the end of the tail, about 2 ft. 9 in., and weigh about 9 lbs.; but I lately got a specimen, in the plumage of *I'mmer*, measuring only 2 ft. 4 in., and weighing but 6 lbs.; and, as I can perceive no difference in its bill from that of glaciàlis, I am forced, in following the indications of Temminck, to consider it as that bird, though its diminutive size would have led me to consider it as the young of *Colýmbus* árcticus, which I have not yet ascertained in this country. That these birds are well able to fly, I have had frequent proofs; but not so as to their pedestrian capability. One which I got alive and uninjured, on being placed within a few yards of the water, when I was setting it at liberty, remained on its breast, looking wistfully at that element in which it was accustomed and wished to move, but appeared quite incapable of transferring itself to it; and, though placed repeatedly upright, it always fell down again on its breast: and it was only at length emancipated from this helpless state by being placed close to the edge of the water, when pushing itself along with its wings and feet, it got afloat, and, joyfully diving, bid us a long adieu. The mode in which the toes are jointed with the tarsus prevents their being bent forward out of its line; and the great sharpness posteriorly of that member renders it almost impossible for it to walk; and this trial of its powers would seem to indicate that it can only rise on its wing from the water. I therefore think it must hatch on cliffs or low islets, from which, without much exertion of its feet, it could launch itself.

† The speckled diver is also very common in this country, though the red-throated diver occurs but rarely: I have, therefore, as yet, been unable to trace the connection between them; but, from analogy with *I'mmer*, I am disposed to coincide with the views of Temminck and suppositions of Edmonstone, and consider stellàtus as the young of septentrionàlis; and I think that the reason why the latter, relatively to the former, appears in

C. Troìle, Guillemot, s.p, c *
mìnor, Lesser guillemot, a.p, c
Grýlle, Black guillemot, re, c
Spotted guillemot

A'lca árctica, Puffin, s.p, c.
Pìca, Black-billed auk, c †
Tórda, Razor-bill, s.p, c

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much smaller numbers than glaciàlis, compared with *I'mmer*, is, that both stellàtus and septentrionàlis leave this country much earlier than the others, and consequently before the period when, like stellàtus, *I'mmer* would have assumed the plumage of maturity. Like *I'mmer*, they also vary much in size, which has induced Bewick to mention three varieties of the speckled diver. One which I sent to the Dublin Royal Society, corresponding with his second variety, is several inches shorter than two in my collection.

* The valuable testimony of Edmonstone, who has so thoroughly investigated the subject, renders it almost unnecessary for future ornithologists to say much more to establish the identity of Colýmbus *Troìle* and mìnor, and of *A'*lca *Tórda* and *Pìca*; yet, as Montagu (whose opinion the British naturalist ought so justly to respect) has so ingeniously supported the opposite opinion, and as I have had particularly good opportunities of observing these birds, I am unwilling to neglect adding my testimony to that of Edmonstone and Temminck. By the unprejudiced enquirer, the evidence of experience, in subjects of this nature, will always be preferred to the most elaborate reasoning of the scientific; for it is by this test alone that the value and correctness of their conclusion can ultimately be estimated, and it is to it they must ultimately themselves have recourse. The principal ground on which Montagu forms his opinion of their being distinct is, the inferior size of the body and bill of *C.* mìnor; which circumstance universally prevailing, if he succeeded in proving the maturity of the bird, would undoubtedly have warranted the conclusion he has drawn. As he however fails, I think, in doing so; and as we find, in almost all instances, though often not very apparent, that young birds are inferior in both these respects to the parent bird; and as in spring (precisely at that period when the young bird would in these respects have attained nearly to the perfection of the old one) I have met with mìnor having the bill as long though not quite so *hard*, with the same indentures in it, and the body as large as any foolish guillemot I ever saw, of which, soon afterwards, there are immense numbers all along this coast; I think it will be admitted as strong proof against the views of those who maintain the opinions of Montagu, who would, I am sure, have, on more extended examination, admitted the incorrectness of his first opinions on this subject.

† The same reasons have led me to a similar conclusion respecting *A'*lca *Tórda* and *Pìca*. I have been enabled, by procuring many specimens of the latter, at different periods during winter and the early part of spring, to trace uninterruptedly the change from the immature plumage of *Pìca* to the perfect garb of *Tórda*; and in one specimen of the former, killed late in spring, the bill was nearly as large as in the latter, and much larger than in those killed previously to it in winter: the white stroke from the eye to the bill, and the white line on the upper mandible, were also pretty distinctly marked. These periodical distinctions I have always found coincident with the advance of the season.

Art. IV. *Hints for Improvements.*

Conventional Signs, to express Objects in Geology and Physical Geography. — Sir, Physical geography and geology having become popular sciences, the slightest hints which tend to their progress will, I am persuaded, find ready admission into your journal. Half a century since, such a thing as a physical map of a country was almost unknown; zigzag lines, traced without any regard to accuracy, designated the course of rivers, and a number of well-formed mole-hills were intended to represent mountains; "the big Hill of Howth" proudly vying in importance with Chimborazo. Something has been done towards the correction of such incongruities, but much remains to be done; and in this respect we are much behind our neighbours the French and Germans. This principally arises from the want of conventional signs: but if this be to be regretted in physical geography, it is still more so in geology. It will be said, that we have excellent geological maps. True: the greatest praise is due to Messrs. Smith and Greenough; but they are obliged to call in the aid of colours to designate the different formations: however, here the end is attained, and if not in the best manner, yet so as to afford the requisite instruction. Our artists, like so many Doctors Syntax, scour the "wide world" in search of the picturesque. A fine mountain is a fortune to them; it makes such a pretty picture! and, after it has passed through the hands of a Heath or a Finden, becomes an elegant ornament to a book: but I would ask, like the mathematician at the theatre, what does that prove? Why, that the scenery is very beautiful, and very romantic: the eye is delighted, but the mind is not instructed or improved; and this, too, for the want of conventional signs. Now, Sir, I submit whether this be not a subject worthy the consideration of the Geological Society. In heraldry we have lines and dots, which perfectly designate the colours to be blazoned on a shield: why should we not employ a similar method to designate the different formations? These signs, fixed and authorised by the Geological Society, would soon become generally adopted. Our travellers would soon learn them by heart, and fix them in their memories. Any of the popular treatises on geology would enable them to ascribe to the landscape, especially mountain scenery, its true character. They would embody it in their sketches, and thus aid, without trouble or difficulty, the progress of geological science. The artist, thus viewing his landscape with the eye of science, will find new charms in his pencil; and, instead of contenting himself with a distant prospect, he will approach his object, study its geological structure; and, instead of bringing home a series of merely pretty views, he will have to offer a valuable tribute to science.

Almost every science has its signs; and I trust that Messrs. Murchison, Buckland, De la Beche, Sedgwick, Lyell, Greenough, Conybeare, &c., will feel that geology, which ranks in importance with the highest, ought no longer to be without them. — *J. Byerley. London, April* 29. 1832.

Art. V. *Retrospective Criticism.*

Facts and Observations in Natural History, communicated by Mr. Sells, the publication of which, in this Number, was promised in p. 470. of the last, must stand over until the next Number. — *J. D.*

On Birds oiling their Plumage. — Sir, In answer to Mr. Waterton, "On birds using oil from glands, for the purpose of lubricating the surface of their plumage," and particularly with regard to the following paragraph (p. 414.), I send you some remarks on a tame dove:—" Suppose, for sake of argument, that the bird does actually employ oil from the gland to lubricate the plumage (which, by the by, I flatly deny), how is the head and part of the neck to be so supplied with oil? Why, the truth is, they never can be supplied; and if you examine, with the nicest scrutiny, the feathers of the body which come *within* the range of the bill, and the feathers of the head, which are *out* of the range of the bill, and then compare them, you will not observe the smallest difference in their downy appearance: proof positive that the plumage of the body has not been lubricated with oil from the gland." — No proof at all. Last summer, I brought up, by hand, a turtle dove, which I accustomed to fly about my room, till within this last month, at all times, except at night. Invariably, when I had it sitting on my hand, it would begin pluming itself (particularly while in moult, which it was for about four months), and, at such times, it was curious to see it apply its bill to the gland or nipple just above its tail, and, by pinching it, procure something (though I could never discover what); on withdrawing its bill, it always stretched out its neck, and twisted its head about in the strangest manner, with its eyes shut, and the bill opening and shutting, as if the act of chewing something which put it in pain, but which, I always considered, was for the purpose of spreading, or allowing the substance procured to circulate to all parts of the bill: this operation lasted about twelve seconds, and then it immediately applied it, very quickly, to only three or four different parts of its plumage at a time, and, at its pleasure, easily enough, all over its head and neck, by rubbing them on such parts as were within a convenient distance (for who ever saw a bird, particularly a duck, wash itself, without observing it rub its head and neck on its back, or the shoulders of its wings?): this I have seen it do at least ten times in as many minutes, on my hand; but confess I could never detect what it was it procured from the gland for the purpose of spreading over its plumage, though I could distinctly see it pinch the nipple, as it would allow me to remove the feathers while in the act. Yours, &c. — *H. Henslow. St. Albans, June* 14. 1832.

Stormy Petrels taken in the Interior of the Island. — Sir, I have before now heard the remark made, that if one were to enumerate all the birds to be met with in any district, or even parish, it would be quite surprising to see how full and extensive a catalogue might by this means be supplied; especially if the district selected for the purpose, in the first instance, be one favourable for ornithology, and all those species included in the number which are only occasional or merely accidental visiters. Who would have looked to find the stormy petrel in Warwickshire, the most central portion of the island? Yet so it is: one of your correspondents records the fact of two of these birds having been taken in or near the town of Birmingham (see p. 283.). Nor are these the only instances of the kind that have occurred. A friend of mine, who resides at Coventry, has in his possession a specimen of the stormy petrel, which was caught in the streets of that city on the 2d of November, 1820, after some very tempestuous weather. The bird was first observed flying up Bishop Street, about 7 ft. or 8 ft. from the ground, apparently much exhausted. It had attracted the notice of several persons, and was eventually captured by my friend's assistant clerk, who knocked it down in the street with his hat. Another specimen of this bird, I am informed, was likewise taken in Coventry, some time between the spring of 1825 and 1827: the exact date I have been unable to ascertain. This latter specimen was killed in Much Park Street, by a waggoner, with his whip; and is, I believe, now in the collection in Sir Eardley Wilmot.

Mr. Warner, to whom I am indebted for the above particulars, has just forwarded to me the following communication relative to other and more recent captures of the species in this vicinity: — "May 21. 1832. I have this morning seen two more specimens of the stormy petrel: one of them was shot on the 20th or 21st of December last, while sitting by the side of a pit at Stivichall (about a mile from Coventry): it is a very fine specimen. The other was found dead, by the side of the canal, some time during last winter." From the above instances, it would appear that it is by no means so unusual a circumstance as one might have supposed, for the stormy petrel to be driven far in shore by violent gales; and to be met with, in an exhausted state, in the interior parts of the country.

I may here mention, as an additional instance of superstitions connected with natural history (see p. 209.), that it is, as I am informed, accounted ill luck by the sailors to kill a stormy petrel, or (as they call the bird) "Mother Carey's chicken." But on this subject of superstitions I may, perhaps, add a remark or two on a future occasion. I am, Sir, yours, &c. —*W. T. Bree. Allesley Rectory, May* 23. 1832.

Wilson has some most sensible remarks on the ominousness and hatred which sailors attach to the stormy petrel, as appears by the interesting article which Professor Rennie presents of this bird, under the name of "petrel," in his edition of Montagu's *Ornithological Dictionary*. — *J. D.*

Inland Specimens of the Forked-tail Petrel. (p. 282, 283. 380.) — It is very remarkable that so rare a bird as the forked-tail petrel (Procellària Bullóckii of Fleming, whose name I prefer to "Leáchii," for the reason stated by himself) should have been so extensively diffused over the country as it has been this year. In addition to those mentioned as being found in Oxfordshire (p. 282.), in Worcestershire (p. 380.), in Herefordshire (p. 283.), and in Warwickshire (p. 283.), I have been informed that a number have been obtained in the neighbourhood of the metropolis. Besides these, four have been picked up dead in the vicinity of York, one or two near Hull, one at Thirsk, and three or four near Halifax. — *Thomas Allis. York, 8th of the 5th month* (*May*), 1832.

Grey Phalarope. (p. 282, 283. 379.) — I have this year obtained a most beautiful specimen of the grey phalarope, which was taken up dead in a ditch near this city [York]. — *Id.*

The British Species of Petrel. — Sir, At p. 282, 283, mention is made of the forked-tail petrel, and the reader is referred to Dr. Latham's *General Synopsis of Birds*; thereby making it appear that the author was unacquainted with the discriminations which have taken place, within these few years, on that subject, as well as on many others. I beg leave, therefore, to inform you, that, had the doctor's late work on ornithology been consulted, it would have been found that the bird in question has been fully described under the name of Leach's petrel; and that the several birds formerly known by the name of stormy petrels are now found to consist of three distinct species, and are so described in the *General History of Birds**, viz. stormy petrel (vol. x. p. 289.), long-legged petrel (vol. x. p. 193.), and Leach's petrel (vol. x. p. 194.); all of which are British. There is also a fourth, which has been confounded with the others, and which is figured in the *American Ornithology*, vol. vii. pl. 60. fig. 6.; and this is probably the frigate petrel of the *General Synopsis and History of Birds*. As to the other forked-tail petrel, mentioned (p. 282.) as being 10 in. in length, this is probably the one so called both in the *General Synopsis* and *History of Birds*, p. 188., and is a totally different and larger species. It is, therefore, to be hoped that, before the inquisitive naturalist forms his opinion on any ornithological subject which may come under his observation, he will no longer consult the *General Synopsis of Birds*, published between forty and fifty years since, as he may meet with fuller information by looking into the *General History of Birds* of the same author, and which made its appearance little more than seven years ago. I am, Sir, yours, &c. — *Aristophilus. April* 9. 1832.

A Wigeon's Nest in England. — Your correspondent J. C. tells us (p. 384.) he found a wigeon's nest. This is the first time I have ever heard of a wigeon breeding in England. I hope he reared the young, which, he informs us, were hatched from the eggs he carried home. — *Charles Waterton. Walton Hall, May* 12. 1832.

Habits of Incubation of the Carrion Crow (*Córvus Coròne* L.). — Sir, Observing (p. 142.) some remarks, by Mr. Waterton, on Professor Rennie's new edition of Montagu's *Ornithological Dictionary*, I resolved, during the present season, to ascertain, as far as practicable, the truth of the professor's assertion that the carrion crow does, on leaving its nest, cover the eggs with wool, rabbit's fur, and such like soft materials. Now, though I take Mr. Waterton to be a clever man in his way, yet I think that he treats Mr. Rennie very roughly and unceremoniously; and, instead of awarding him the merit due to his laborious and successful investigations through the mazes of natural history, he abuses him through thick and thin, and calls his plan of study (the most of which is very excellent) "a mere exhalation of his own brain," "a kind of will-o'-the-wisp, which will lead his pupils into the swamp of error." However, I will return to the crow. Wishing, as I have before said, to examine their nests; and, by ocular demonstration to convince myself either of the truth or incorrectness of Mr. Rennie's statement, I have, during the past six weeks, ascended, by means of "climbers," no less than four and twenty trees. Fifteen of these nests had eggs; and, out of them all, only one was in any way "covered." This was built in an elm covered from top to bottom with ivy; and the eggs in the nest were strewed with a few fresh-picked ivy leaves, which entirely concealed them: indeed, at first, I thought it had been constructed the year before; but, on removing the leaves, I discovered the eggs deeply embedded in soft moss and wool. Now, to account for this seems difficult; and, I must own, I know of no satisfactory explanation but that the bird, while sitting, might have pecked them off, so closely was she surrounded with the leaves, though, perhaps, with no intentional purpose. But what, I think, deceived Mr. Rennie, at first a little deceived me: some of the nests have such deep beds of wool, moss, and cows' hair, that the eggs seemed quite lost; and might have given the professor his erroneous idea of their being covered with those substances, "to keep them warm." It is well known that the long-tailed titmouse (*Pàrus caudàtus L.*) lines its pretty mansion with such a profusion of feathers, that sometimes, to obtain the eggs perfect, it is necessary to take it to pieces; as does also sometimes the golden crested wren (*Régulus* cristàtus *Ray*), the eggs of which are bedded in a similar manner.

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* *A General History of Birds*, by John Latham, M.D. &c. &c.; in ten volumes 4to; 1821—1824.

But, before I conclude, I must again beg Mr. Waterton to alter his style of diction with regard to the professor; and, instead of picking out all his little errors, and thus holding the work up to public odium, to say something about his great talents, and unwearied investigation in the pursuit of natural history. — *A. B. C. London, April* 21. 1832.

The Nuthatch, Sitta europæ'a L. (p. 488. 502.) — Mr. Dovaston incidentally remarked, in a letter written to us on March 28. 1832, " I saw the nuthatch, this morning, cleaning out his hole for matrimony." The same gentleman favours us with additional remarks on the same bird, at p. 502. of the present Number: all the facts are additional to those supplied in p. 488, 489. Mr. W. H. White asks, and describes cases that suggest his query (Vol. IV. p. 465.), if it be accurate to reckon the nuthatch truly a mason bird; as it appears to use masonry rather in the fortification of its nest, than in the construction of the nest itself? Mr. White has seen an instance, or instances, in which no masonry at all, even for fortification, had been used. This question, which seems only one of degree, we beg to commit to the *responsibility* of some kind correspondent, and pass on to exhibit Professor Rennie's new view of the uses of the masonry which the nuthatch does usually apply to her place of incubation. Montagu thus says (*Dictionary*, 2d edit., p. 340.) :—" The nuthatch chiefly affects wooded and enclosed situations, choosing the deserted habitation of a woodpecker, in some tree, for the place of nidification. This hole is first contracted by a plaster of clay, leaving only sufficient room for itself to pass in and out. The nest is then made," &c. " If the barrier of plaster at the entrance is destroyed when they have eggs, it is speedily replaced [the instance described by Mr. W. H. White (Vol. IV. p. 465.) is a beautiful example of this]; a peculiar instinct to prevent their nest being destroyed by the woodpecker and other birds of superior size, that build in the same situation." Professor Rennie appends to this view, by Montagu, the following, by himself:—" It appears to me no less probable that the wall may be constructed to prevent the unfledged young from tumbling out of the nest when they begin to stir about; for all young birds of a certain age become very restless; and, in the instance in question, they might, if there was no barricade, find their way out, and be precipitated to the bottom of the tree." — *J. D.*

Supplementary Remarks on the Communication, " On some remarkable Forms in Entomology." (p. 318—327.) — I beg leave to correct a few trifling errors which have crept into my paper upon some remarkable insects, and to introduce an additional observation or two. And, first, with regard to the derivations of the names employed, and which have been introduced in *editorial* parentheses. Although I constantly adopt the very necessary plan of giving the derivations of names proposed by myself, I did not introduce them into my paper, because they were names imposed by others, who, in some instances, have not given the derivation of their names.

Entomologists are at variance respecting the name Paússus; some considering that Linnæus intended it to have reference to the circumstance of the insect's being the last which he described; and, consequently, that the word was derived from *pausa*, a full stop: in which case the name ought to have been written with only one *s*; alleging that such a fanciful method of " coining names " was not unusual with the great Swede: but whatever may have been its intended derivation, it has appeared to me to be more correct to adopt the name as proposed by himself, as he has given no clue to his intention. The word Diópsis ought rather (as it has been suggested to me) to be considered as derived from *dia*, through, and *opsis*, vision;

because the sight must be supposed to pass *through* the long ocular footstalks; rather than from *dis*, twice, and *opsis*, or "assisted inspection," as J. D. has rendered it. Respecting the derivation of Elénchus, there must be some mistake; for Curtis, speaking of the pseudelytra, or short lateral appendages of the thorax, says, "viewed above, they look like pendants for the ears; whence the generic name:" he has not, however, given the Greek root. The word Mormólyce (not Marmólyce, as misspelt), it has been suggested to me, has reference rather to the shape of a violin, of which a slight idea is given by the form of the insect; but your editorial supposition of its allusion to a hideous spectre appears equally probable. The derivation given of Chiasognàthus does not exactly express Mr. Stephens's intention; since he informs me that he alluded to the peculiar manner in which the jaws cross over each, the Greek word *chiazō* referring to the letter X.

The engraver, in introducing the antennæ near the eyes, in the figure of Diópsis, cut out the two fine spines which arm the centre of the ocular footstalks (and which were represented in the proof which I saw), probably supposing that the antennæ had been misplaced in their former situation. The more highly magnified figure, which I now enclose, (*fig.* 103.), of one of these footstalks, exhibits this spine, as well as the peculiar situation and structure of the antennæ.

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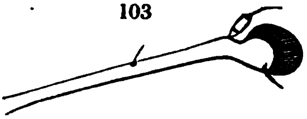

I omitted to mention that the first notices and figure of Elénchus Wálkeri appeared in this Magazine (Vol. III. p. 332.), where it is mentioned by Mr. Dale as a "very minute Stýlops?" Curtis mentions only one specimen, captured by Mr. Dale*; but that gentleman (in Vol. IV. p. 266. of this Magazine) makes further mention of a "Stýlops? or n. g.? Wálkeri?" taken in the preceding June, without reference to his previous notice: adding, "I cannot find any bee about likely to produce a Stýlops now; it might come from some *Véspa*, and then would probably be a Xènos?"; with the farther addition (p. 267.), "The Stýlops is certainly a new genus, and the only one in the order which I have taken this year." I also omitted to mention, that the Paússidæ, as well as the Diópses, are inhabitants of the tropical climates of the Old World, being found in India, Sierra Leone, Senegal, &c., and that several species of Stýlops are found in England.

For "stirpes," p. 326. line 4., read "stipes," the footstalks, or basal portion, of the mentum or chin.—*J. O. Westwood. The Grove, Hammersmith, May* 24. 1832.

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* I would here request permission very earnestly to suggest to this most indefatigable gentleman, that the manner in which some of his most valuable captures are announced is sadly tantalising to those who, like myself, have no means of obtaining further information upon the subjects which he mentions: for instance, in the passages quoted above, doubts may be entertained whether both statements refer to the same insect. Is it a Stýlops, a Xènos, or an Elénchus? surely the inspection of the antennæ would instantly have shown whether it belonged to Xènos, as Mr. Dale appears at one time to have considered. In like manner, what is the fact to be learned in the indecisive statement contained in No. 19. [Vol. IV. p. 267.]:—"I once had a specimen of *Bómbyx* menthástri, and six of Ophìon vínulæ, hatched from the pupæ of *Bómbyx* vínulus; which is certainly a curious fact." Again, many of the most interesting announcements in his paper, in No. 25. [Vol. V. p. 249—252.], are very perplexing, and marked with interrogations.

THE MAGAZINE

OF

NATURAL HISTORY.

SEPTEMBER, 1832.

ORIGINAL COMMUNICATIONS.

Art. I. *Remarks on the Spring of* 1832, *as compared with that of* 1831, *together with a Calendar showing the Difference of the Two Seasons.* By the Rev. W. T. Bree, M.A.

"Æstatem increpitans seram, zephyrosque morantes." *Virg. Georg.* 4.
"Chiding the tardy summer, and the zephyrs long delay'd."

Notwithstanding the unusual mildness of the preceding winter (the mildest, I think, I ever remember [*]), the spring of the present year has been, contrary to what might have been expected, any thing but an early one. The backwardness, indeed, of the season has been a subject of conversation in the mouth of almost every body; and the justness of the remark will appear more circumstantially, upon an inspection of the following calendar, which records the dates of such natural occurrences as I happened to have noted equally in each of the two seasons, viz., the spring of 1832 and that of 1831. Some of the first spring flowers, indeed, such as the snowdrop and several species of crocus, which usually expand their blossoms in January or February, if only the weather be open, and their progress be not retarded by frost, were earlier this season than they were in the one preceding: but, with comparatively few exceptions, the flowering of plants, the appearance of insects and of our summer birds of passage, in a word, the signs of spring, were this year later than usual. The fieldfares [†] tarried with us till towards the middle of May; a pretty sure criterion of a late spring. That admirable songster, the blackcap (I quite agree with Mr. Dovaston in his praise of this bird's vocal powers, see p. 425.), was unusually late in coming, not presenting himself to our notice in this part of the country till the 18th April. I almost began to fear that he had missed his road, and would not find his way to us at all. Our little favourite, Polyómmatus Argìolu*s* (azure blue butterfly), which generally comes forth by the middle of April, or earlier, was still more tardy, not making its appearance till the 18th May; and Pónti*a* cardámines not till the 17th of that month. On the whole, the spring of the present year was unquestionably a backward one; and it appears, therefore, that an early spring is not to be looked upon as a sure consequence of a very mild and open winter.

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[*] The throstle was to be heard singing almost throughout the winter; and the titmouse commenced its spring note on the 27th of December.

[†] These birds were much less numerous, at least in this part of the country, during the season of 1831-2, than usual. I scarcely saw a good

	1832.	1831.
Winter aconite flowered - - -	January 13	Jan. 6
Snowdrop flowered - - - -	17	22
*C*ròcus biflòrus flowered - - -	February 1	Feb. 10
*P*halæ'na primària* appeared - -	3	16
Common yellow crocus flowered - -	4	16
*C*ròcus revolùtus flowered - -	7	12
*M*úsca tènax (drone fly) appeared -	9	10
Chaffinch sang		8
Hive bees appeared - - -	18	10
*L*eucòjum vérnum flowered - -	20	14
Rooks began to build - - -	March 8	March 9
Purple saxifrage (*S.* oppositifòlia) flowered	9	1
Apricot tree flowered		4
Pilewort flowered - - -	18	3
Wood anemone flowered - -	24	12
A'pis terréstris appeared - - -	29	19

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flock of them throughout the winter. In the spring, however, a considerable party, with their usual attendants, the redwings, frequented the trees near my residence, for the purpose of feeding upon the ivy berries, which they greedily devour at that season of the year. In the month of April I observed them, for many days in succession, at the same hour of the morning, pay their regular visit to the same trees, chattering and hopping from branch to branch, and busily employed among the ivy; and I may mention, as rather an extraordinary feat at so late a period of the year, that my man shot eight fieldfares on the premises, in a very short space of time, on the 26th of April. On the 4th of May I observed a small flock of them high in the air, pursuing a straight and steady course towards the northwest. I conceived them to be on their departure, and that I should see no more of them for the season. On the 7th of May, however, some were again seen visiting their favourite ivy trees; and, finally, I saw a few in another part of the parish on the 14th of May.

* One of the earliest and most constant intimations of approaching spring is the appearance of this insect, and of one or two other moths, floating with expanded wings on the surface of ponds and still water.

	1832.	1831.
Cáltha palústris* flowered - -	March 30	April 10
*S*pártium scopàrium* flowered - -	April 2	15
*À*pis retùsa appeared - - -	3	4
Vanéss*a* urtìcæ † appeared	4	March 28
Gonépteryx rhámni ‡ appeared		April 29‡
Willow wren (Sýlvia *T*róchilus?) § sang		March 21
Plum tree flowered - - -	6	April 6
Pear tree flowered - - -	7	6
Cherry tree flowered		6
Dog violet flowered - - -	9	6

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* A single plant, in a warm and sheltered situation. The general blooming of each species was not earlier than usual.

† This butterfly is commonly drawn forth from its winter quarters by one of the first warm and sunny days that happen to occur in the month of March: hence it has been termed " fallax veris indicium " (the deceitful token of spring). In the Isle of Wight I once saw it on the wing the 8th of January, 1805. I may here remark, as a circumstance of unusual occurrence at so early a period of the year, that, on the 10th of March, 1826, I saw on the wing, and at large, in the course of a morning's walk (not on entomological research) in this parish, no less than five species of *P*apiliónidæ, viz. Vanéss*a* urtìcæ, polychlòros, c. álbum, and Í*o*, and Gonépteryx rhámni; and, of the first and last, many examples. The 10th of March may certainly be considered rather early for the appearance of any butterfly, at least in this part of the country. But what I think remarkable in the present instance is, that the above-mentioned five constitute *all* the species that are ever to be seen hereabouts so early in the spring; and, of these, neither Vanéss*a* polychlòros, c. álbum, nor Í*o*, is common in this neighbourhood. I therefore noted the occurence among my *memorabilià* [memorable events]. I need hardly add that this 10th of March, 1826, was a most serene and lovely day, warm and free from wind, and with bright sunshine. If newspaper authority may be trusted, a swarm of bees was taken in a garden hedge of John Day, of Swarby, near Sleaford, the same day. (See *English Chronicle*, March 16. 1826.)

‡ I did not happen to see Gonépteryx rhámni in 1831, till the above date, which is late for its first appearance: by others, on whose information I can depend, it was observed on the wing the 28th of March in that year.

§ I am by no means certain that I have correctly assigned this name, as well as that of the lesser pettychaps (Sýlvia hippolàïs) to their proper owners. The bird I allude to by the name of Sýlvia *T*róchilus must be, I should think, the earliest of our summer birds of passage, if indeed it does not remain with us through the winter. It may generally be heard about the middle of March, sitting towards the top of a tree in the vicinity of woods and plantations, and uttering its not unpleasing note, which, so far as I am aware, consists only of *chinck-chinck, chinck-chinck*, frequently repeated. The species here intended by the lesser pettychaps arrives about the same time with the swallows, or a day or two before them; it frequents hedges and bushes, more particularly in low moist situations; and its warbling song, though short, is sweetly melodious. Both birds are very common; and, though they differ widely in their periods of arrival, habits, and especially in their song, they closely resemble each other in the colour and markings of the plumage. Like some other observers, I find the willow wrens, pettychaps, and whitethroats, a most difficult tribe to distinguish. Perhaps some contributor to the Magazine may be able to throw more light on the subject.

	1832.	1831.
Redstart sang - - - -	April 14	April 11
Lesser pettychaps (Sýlvia hippolàïs?) sang -	15	8
Swallow (*H*irúndo rústica) appeared -	16	11
Stellària *H*olóstea flowered		11
Blackthorn flowered		11
Pónti*a* ràpæ appeared - - -	17	11
Blackcap sang - - -	18	March 29
*C*ardámine praténsis flowered - -	21	April 12
*S*cílla nùtans flowered - - -	25	21
Martin (*H*irúndo úrbica) appeared -	27	May 6
Cuckoo sang - - - -	May 1	April 24
Swifts appeared - - -	6	May 13
Hippárchi*a* Megæ'r*a* appeared	7	19
Ægèri*a* appeared		5
Least dragon fly (Lībéllula vírgo) appeared		6
Apple tree flowered		April 26
*Verónica C*hamæ'drys flowered		May 5
Nightingale sang - - - -	10	April 24
Hawthorn flowered - - -	12	May 10
Fieldfares last seen - - - -	14	April 21
Pónti*a* cardámines appeared - -	17	23
Polyómmatus Argìolu*s* appeared - -	18	19
Pónti*a* brássicæ appeared		May 12
Panórpa commùnis appeared		18
Cockchafer appeared - - -	22	15
Ermine moth (*B*ómbyx menthrástri) appeared	26	20
*S*carabæ'us auràtus appeared - -	29	April 14
Libéllula dépressa appeared - -	31	May 18
*S*carabæ'us hortícola appeared - -	June 2	23

The last named insect is considered exceedingly destructive in gardens. Being on a visit in Staffordshire, in the month of June, I observed whole beds of strawberries (not hautboys) likely to prove nearly barren, though they had flowered copiously, and the season was favourable for a crop. I was informed that the failure was owing to the fernshaws (the provincial name for the beetle), which are accused of eating the anthers and interior parts of the blossom. In the same garden my attention was also called to the ravages committed by this depredator on the apples, by gnawing holes in the young fruit; which consequently dies and falls off, or at least becomes much blemished. I was assured that the fernshaws had been detected in the fact; and I am rather disposed to think that the charge in both instances is well founded. I had long been aware of the insect's partiality for rosebuds and blossoms, which it greedily devours. In the north of England, where it is much used as a killing bait for trout, the insect is commonly known by the name of "bracken-clock," a name of the same import with the Staffordshire term "fernshaw," each signifying "fern-beetle."

The Fieldfare feeds on the Berries of Ivy. So does the blackbird, and so do other species of the thrush family, and probably birds of other families as well. The dryish and somewhat mealy pulp of the ivy berry seems to be the only part of it which affords them nutriment, as the skins and seeds of the berries may be found voided on the surface of the grass, soil, and wall tops, which may chance to be in the neighbourhood of the berry-bearing plants of ivy. The naked seeds of ivy, enlarged by the moisture of a bird's body, considerably resemble swollen grains of wheat; and the accurate

Ray records the following tradition founded on this resemblance:—"Grana baccis exempta, triticeis nonnihil similia, cùm a nonnullis in areis et templorum tectis a volucribus temerè sparsa inventa fuerint, occasionem illis dederunt imaginandi, rumoremque in vulgus prodigiorum credulum spargendi, tritico pluisse." — *Catalogus Plantarum Angliæ et Insularum adjacentium*, ed. 1670, p. 160. Ray's meaning may be thus explained: — The seeds removed from the berries resemble grains of wheat; and when found in open spaces, and upon the roofs of buildings, where they had been scattered by birds, have given occasion to the common people, credulous of prodigies, to rumour that the heavens have rained down wheat.

The Blackcap honours the Bayswater gardens with its presence and melody. It sang liberally, both last year and this, about the office of the Magazine of Natural History. I have not heeded dates, but believe that this year I did not hear it here till near the close of May, and then through June, and to the 6th of July, when I left for a ramble into the country. The blackcap, in Cambridgeshire, is the theme of an elegant and expressive simile, viz., "as cheerful as a blackcap," applied both to grown up persons of habitual cheerfulness;

> "And jovial youth, of lightsome vacant heart,
> Whose every day is made of melody."

Nightingales were singing in Kensington Gardens in the middle of the day (night I will not answer for,) of the 25th of April: all joy and soul they were; and the day was slightly sunny, with a cool feeble wind, after rain the day preceding: the expanding foliage of the leafing trees was all around looking lovelily, but the nightingales preferred the denser covert of the evergreen holly trees and yew trees.

The *Rose Beetle*, Scarabæ'us auràtus, or Cetònia auràta as now called, is not at all rare about Bayswater, where, if I rightly remember, I this spring saw specimens on the wing by the middle of April. The larvæ here inhabit the soil of the gardens, although what I have somewhere read may be very true, that their usual habitat is decayed wood. I think this species is far from plentiful in Suffolk and Cambridgeshire. On the 29th of June, 1831, I saw here a fine specimen revelling luxuriously among the very numerous stamens of the *Argemòne* grandiflòra. These being yellow in hue, and the petals of the large saucer-shaped flower snowy white, the Cetònia was, by virtue of his rich, varied, and burnished hues, a conspicuous object.

Scarabæ'us hortícola, called "the chovy" in Norfolk, is there deemed very injurious to apple trees, and other trees and plants, as it feeds both on leaves and all the parts of the flower. Chovies were abundant at Thetford, Norfolk, about ten years ago; but, as far as my experience has reached, always rare about Bury St. Edmunds. On the 9th of June, 1829, I saw one in the botanic garden of the last-named town, flitting about a flowering bush of the Provence rose.

Vernal Appearances at Waterbeach, near Cambridge, April 17. 1832. — The following paragraph, extracted from a private letter, may be worth introducing here. — *J. D.*

"We are getting on pretty well with our gardening work, although vegetation is advancing rapidly. The plum trees will next week be in full bloom. The birds sing delightfully. A tomtit, as we call him [the common wren], who with his mate has been building a nest with us, sang this day almost as loud as a lark. A pair of robins have built a nest in my next-door neighbour's out-house, in an unoccupied birdcage. The gnats form themselves into troops of an evening, and are dancing in the beams of the setting sun. A gay species of butterfly has made its appearance, but I have not yet seen the brimstone-coloured one." — *J. D. sen. April* 17.

ART. II. *Additions to the British Fauna; Class, Mammàlia.*
By WILLIAM YARRELL, Esq. F.L. and Z.S.

HAVING devoted a portion of my leisure, during the last winter, to a close examination of all the recent specimens I could obtain, from various localities, of the smaller-sized British Mammàlia, I have been amply repaid the trouble of the investigation, by discovering two species, neither of which have as yet been admitted in any British fauna.

The first of these is a *Sò*rex well known to Continental naturalists, whose remarks and descriptions I shall have occasion to refer to. The second is a species of Arvícola, probably hitherto confounded with the *Mús* agréstis of Ray, which appears to be identical with the *Mús* agréstis of Linnæus, and also with the *Mús* arvàlis of Pallas: but the little animal to which I now solicit attention, I have no doubt I shall be able to prove to be perfectly distinct, and deserving a place, as a true species, in the catalogues of systematic authors.

THE OARED SHREW (*SO`REX RE´MIFER*).

This species is at once distinguished from our more common water shrew, *S.* fòdiens, by its uniform colour. The whole of the upper part of the head, the body, and sides, are velvet black; the situation of the ear is marked by a tuft of white hairs, more conspicuous than in the water shrew, from the greater contrast of colour; under the lower jaw a small patch of light brown; under surface of the body rusty black; tail black, but with a line of pendent greyish white hairs along its under surface; feet and toes ciliated.

This *Sò*rex is stated by Geoffroy in the *Ann. Mus.*, and by Desmarest in his *Mammalogie*, to be the largest of the shrews found in France; and its measurements are stated by Desmarest to be: — length of head and body equal to 4 in. 3 lines English, the tail 2 in. 9 lines. My specimen of this shrew, which was caught in a ditch in Battersea Fields, measures in the extent of head and body but 3 in. 4 lines; the tail 1 in. 9 lines. This difference in relative size might create doubt that my specimen was the real *Sò*rex rémifer. There is, however, in the collection at the British Museum, an example of this shrew, obtained from Mon. Baillon, the celebrated naturalist of Abbeville, and labelled by him as a specimen of the *S.* rémifer, the true *Musaraigne port-rame* of French authors. With this preserved specimen I have been very kindly permitted to compare my own shrew, in hand, side by side; and they agree in every particular, of colour, markings, and measurement, and are, in fact, perfectly identical. I have as yet obtained but one specimen of this shrew; but it is probable that the *Sò*rex ciliàtus of Sowerby's *Brit.*

Mis., p. 49., from a specimen taken in a ditch in Norfolk, may be considered as representing an example of *S.* rémifer; but the specific term ciliàtus is not sufficiently definite, as it refers to a character possessed by all the water shrews.

BANK CAMPAGNOL (ARVI'COLA RIPA'RIA).

The authors of our various British faunas all agree in including but two species of true campagnol (genus Arvícola *Auct.*). The first, A. amphíbia, the water campagnol, or water rat; the second, the A. agréstis, *Mús* agréstis of Ray, our common short-tailed field campagnol. Both these species are too well known to require description; but it will be necessary that I should refer occasionally to the specific distinctions of the latter, in order more clearly to point out the differential characters between that and the Arvícola ripària, or bank campagnol, which I believe to be new.

Mús agréstis *Ray*, Arvícola agréstis *Fleming*, Field Campagnol. — Length of the head and body, 3 in. 6 lines; head only, 1 in. 1½ line; tail, 1 in. 1 line; ears, 5½ lines. Head large, muzzle blunt; ears rounded, nearly hid in the fur; tail not quite one third the length of the body; fur soft, all the upper parts reddish yellow brown, ash-grey beneath.

Arvícola ripària, Bank Campagnol. — Length of head and body, 3 in. 4 lines; head only, 1 in. and half a line; tail, 1 in. 8 lines; ears, 5 lines. Head and muzzle stout; ears rounded, more prominent than in the field campagnol; tail exactly half the length of the body; colour of the fur deep chestnut brown above, ash-grey beneath, hairs on the tail long, adpressed, extending beyond the end of the last vertebra. The external differences are in the size and colour of the body, and relative length of tail. Two skeletons of each species have been set up, and the following are the comparative measurements : —

	Field Campagnol.		Bank Campagnol.	
	inches.	lines.	inches.	lines.
Length of the head - - - -	0	10½	0	9¼
From the first dorsal vertebra to the last	0	10	0	9
Length of the six lumbar vertebræ -	0	11½	0	7½
First dorsal vertebra, to the tuberosity of the ischium	2	3	1	9½
Length of the os innominata - -	0	7¼	0	6¼
Sacral vertebra, to the end of the tail -	1	9	2	2
Scapula - - - - -	0	5	0	4
Humerus - - - - -	0	5	0	4
Olecranon to the carpus - - -	0	6½	0	5½
Femur - - - - -	0	6¼	0	5½
Tibia - - - - -	0	7¾	0	7½
Os calcis to the end of the longest toe -	0	7	0	7¾

The number of cervical, dorsal, lumbar, and sacral vertebræ is the same in both, viz. seven, thirteen, six, and one, respectively: but the tail of the field campagnol has but nineteen vertebræ; that of the bank campagnol contains four more, making twenty-three. It will also be seen, by a reference to the measurement, that the relative dimensions of the body and tail, in each, are nearly reversed. The field campagnol has the cavity of the thorax of much larger size than that of the bank campagnol, the ribs of greater expansion, and the sternum longer. The head of the bank campagnol is shorter, and more square in its form, exhibiting a greater appearance of strength; and although a smaller animal, with a shorter back, as well as shorter limbs, it has actually longer feet.

In the viscera of the thorax I observed no difference. The stomachs in each appeared also of the same form, and both presented an apparent contraction, at the distance of one third from the cardiac orifice. The liver of the bank campagnol was more extensively divided than that of the field campagnol, and contained seven distinct lobes, while that of the latter presented but five. Both species are equally devoid of gall bladder. The difference in the comparative length of the small and large intestines was, however, most decided:—

	Field Campagnol	Bank Campagnol
Small intestines -	- 14½ in.	9⅓ in.
Cæcum - -	- 2¼	4
Large intestines -	- 8	10

These measurements, in which, it will be observed, the proportions are reversed, appear to indicate some variety in their choice of food, with which I am not as yet acquainted, and the contents of the stomachs were too far digested to assist me.

A fourth series of points of distinction may be drawn from their habits. The bank campagnol frequents hedge bottoms and ditch banks; from which circumstances I was induced to adopt the specific term ripària: it is also said to make its nest of wool. The field campagnol, on the contrary, prefers living among the long herbage of water meadows and moist pastures, and makes its nest of dried grass.

If I am correct in my opinion, that the evidence here produced is conclusive as to the distinction of these two species, more precise systematic characters will be necessary; and I venture to propose their separation in the following terms:—

Field Campagnol, Arvícola agréstis.—Suprà rufescenti-fusca, subtùs cinerea; auriculis vix prominulis; caudâ tertiam partem corporis longitudine vix æquante.

Bank Campagnol, Arvícola ripària.—Suprà saturatè castaneo-rufescens, subtùs cinerea; auriculis paulò prominulis; caudâ dimidium corporis longitudine æquante, apice pilis subelongatis.

The first specimen I obtained of this new species was from Birchanger, in Essex; and, by the assistance of kind and zealous friends, I have since obtained two other examples from the same locality. I have also received specimens from three other counties, Hertfordshire, Middlesex, and Berkshire; but it is by no means so common as the short-tailed field campagnol.

P. S. Since sending you an account of the occurrence of the oared shrew (*Sòrex rémifer*) at Battersea, and probably also in Norfolk, I have received a communication from my friend, the Rev. L. Jenyns, who is at present engaged in preparing a *Manual of the British Vertebrata*, that he has himself taken an example of this species of shrew, in a corn field near the fens in Cambridgeshire, since my notice was written.—*W. Y. Aug.* 18. 1832.

ART. III. *Something about Birds and Birdnesting.* By RUSTICUS.

Sir,

UNSKILLED in the abstruser departments, I have often been delighted with those particular parts of your work which smell so freshly of woods and fields, and seem to me like a mirror in which one may behold a true and faithful reflection of Nature's face. Among your contributors in this way, none speaks to the heart like the "wanderer" Waterton. A good deal has been said in your pages of birds' nests, and different opinions expressed as to the manner in which the process of caretaking is managed by the old birds: in comparing what I read, with my previous knowledge of the subject, I find Mr. Waterton always right, and several of your other correspondents always wrong.

The district to which my observations have been pretty much restricted, is that of Godalming, in Surrey; and though they have little that is wonderful to recommend them, let their truth plead their cause, and obtain for them a place among your more scientific and valuable articles.

Habits of the Moorhen. — The piece of water called Old Pond, about one mile from Godalming, on the London road, is a most attractive spot to waterfowl; and an island in its centre is the resort of some of them in the breeding season, and also of a variety of other birds, which find it a safe and unmolested place for the same purpose. I have often delighted, in years that are gone, to visit this island and its inmates; the owner, Robert Moline, Esq., used to allow us free ingress to all and every part of the estate; a liberty any one with an incipient thirst for a knowledge of natural history would be sure to avail himself of. One day, having pushed off from the shore, and moored the little shallop to some of the osiers which surrounded the island, I began my accustomed examination: the first object that attracted my attention was a lot of dry rushes, flags, reeds, &c., enough to fill a couple of bushel baskets. This mass was lodged about 20 ft. from the ground, in a spruce fir tree, and looked for all the world as if it had been pitched there with a hayfork. I mounted instantly, thinking of herons, eagles, and a variety of other wonders: just as my head reached the nest, flap-flap, out came a moorhen, and, dropping to the water, made off in a direct line along its surface, dip-dip-dip-dipping with its toes (they do this just to cool their toes, I have often conjectured), and was at last lost in the rushes of a distant bank, leaving an evanescent track along the water, like that occasioned by a stone which has been skilfully thrown to make "ducks and drakes." The nest contained seven eggs warm as a toast. The situation was a very odd one for a moorhen's nest; but there was a reason for it: the rising of the water in the pond frequently flooded the banks of the island, and, as I had before witnessed, had destroyed several broods by immersion. [See p. 381.]

Nest of the Large black-headed Titmouse, in a Magpie's Nest of the preceding Year. — The next object of attention was a titmouse, of the large black-headed kind, swinging himself about like a ropedancer, and whistling out his sing-song just like a fellow sharpening a saw. To my surprise, the gentleman entered an old magpie's nest, to which I had paid frequent friendly visits during the previous spring; he immediately came out again, and jumped about, sharpening his saw as before. One might almost as well handle a hedgehog as a magpie's nest: in this instance some cuttings of gooseberry bushes, skilfully interwoven into an arch above it, rendered it rather more untempting than usual. I was meditating how to commence the attack, when another tomtit flew out in great choler, and rated at me, as though I had already robbed her: after a good deal of trouble, during which the slender fir top was swinging about with me in the breeze, I succeeded in obtaining a peep into the nest: there was nest within nest; the cosiest, softest, warmest, little nest, with eight delicately specked eggs at the bottom of the magpie's more spacious habitation. I declined meddling with them, whether on account of the awkwardness of my situation, or the intervening gooseberry bushes, or the cruelty, I will not say.

Nest of the Dabchick. — I have occasionally, though but seldom, found the dabchick's nest in the reeds on the banks of this island. Bewick's account of its size is not correct: it is large for the bird, but of very inconsiderable thickness, and always wet, so that the eggs are for ever in a sort of puddle. The eggs in those I saw were three only, dirty white, and about as big as a blackbird's, but longer. I never found any covering on the eggs, or observed any thing near that would answer the purpose; but this habit may exist in some instances: so many naturalists have spoken of it, that it can hardly be fabulous, like the same peculiarity as applied to rooks and crows. On the subject of these, if it wanted contradicting, I could, from personal inspection, hundreds of times repeated, give it a flat denial.

Habits of the Fern Owl. — Beyond Godalming, on the Liphook road, is a great tract of barren heathy land: it stretches wide in every direction, and includes immense peat-bogs, and several large ponds. One particular district, called the Pudmores, is the favourite resort of the fern owl. In the daytime, while walking across the moor, you will every now and then put up one of these singular birds; their flight is perfectly without noise, and seldom far at a time: but of an evening it is far different; about twenty minutes after sunset, the whole moor is ringing with their cry, and you see them wheeling round you in all directions. They look like spectres; and, often coming close over you, assume an unnatural appearance of size against a clear evening sky. I believe its very peculiar note is uttered sitting, and never on the wing. I have seen it on a stack of turf with its throat nearly touching the turf, and its tail elevated, and have heard it in this situation utter its call, which resembles the birr of the mole-cricket, an insect [figured Vol. II. p. 290.] very abundant in this neighbourhood. I have almost been induced to think this noise serves as a decoy to the male molecricket, this being occasionally found in the craw of these birds when shot. Those who may not be acquainted with the cry of the bird or the insect, may imagine the noise of an auger boring oak, or any hard wood, continued, and not broken off, as is the noise of the auger, from the constant changing of the hands. The eggs of the fern owl have frequently been brought me by boys: they are only two in number, greyish white, clouded and blotched with deeper shades of the same colour; the hen lays them on the soil, which is either peat, or a fine soft blue sand, in which she merely makes a slight concavity, but no nest whatever.[*] The first cry of the fern owl is the signal for the night-flying moths to appear on the wing, or rather the signal for the entomologist's expecting them.

Habitat of the Blackcock and of the Lapwing.— From the Pudmores, along the brows of the heath hills, towards Tilford, and again from Tilford up to the Devil's Punchbowl on Hindhead, the black cock is found every year more or less abundantly; and the lapwing breeds throughout the district by thousands.

I am, Sir, yours, &c.

Godalming, July 28. 1832. RUSTICUS.

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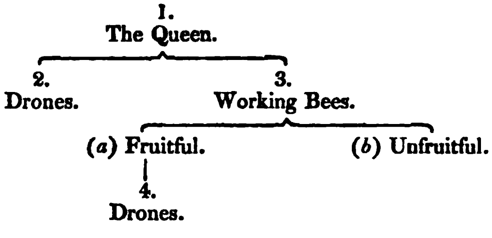
[*] Does this bird remove its eggs to another place when they have been discovered? Audubon, in his *Ornithological Biography*, states having himself witnessed the *C*aprimúlgus carolinénsis to do this, and that the male and female took each an egg in its large mouth, and then they flew off together. Mr. Hewitson, in the 7th Number of his interesting *British Oology*, figures, t. 30., the egg of the *C*aprimúlgus europæ̀us *L.*, and quotes Audubon's account of the *C.* carolinénsis, that observers may ascertain if *C.* europæ̀us also ever transports its eggs; and for the same object it is that the question is here noticed. Since the above was printed, a farther contribution towards the history of this bird has been received; see p. 674. —*J. D.*

[illegible] increased [illegible] in many of the [illegible] fruitfulness. I now [illegible] in the immortal and [illegible] whose minds are not [illegible] to receive a [illegible] because it has been [illegible] acknowledgment and deserved

[illegible] for much valuable in- [illegible] the natural history of the bee, as well as [illegible] theories, was a strenuous advo- [illegible] of the common bee; and he says [illegible] that an egg should be in the comb, as the bees themselves possess the astonishing power of converting it, *by a process known only to themselves*, into a queen bee. Schirach, however, adduces no facts grounded on experience to substantiate this statement; on the contrary, it was, on his part, merely a broad undemonstrated assertion, leaving it open to all the doubts and objections which could be brought against it: nevertheless, it was productive of this good effect, that it drew the attention of others to the subject, who, by their skill and perseverance, were most able to confirm its truth or fallacy. Bonner was originally one of the staunchest adherents of Schirach; but the result of his experiments by no means established satisfactorily to himself the validity of the hypothesis: on the contrary, the laſt time I visited the worthy apiarian, at Roslin Castle, near Edinburgh, he candidly avowed, that, although he did actually succeed *in one instance*, yet he could by no means lay it down as a general rule that the common bee does actually possess the power, *per se* [of itself], of generating a queen.

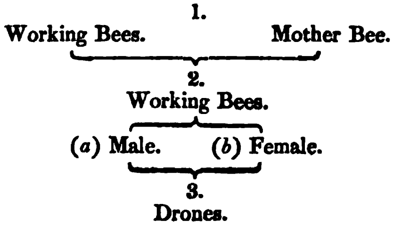
It may not be the least interesting and valuable part of this enquiry, to investigate the different systems relative to the propagation of the bee, as laid down both by the English and foreign apiarians, as from an examination of their different hypotheses a guide may be obtained to the actual truth.

The system, as advanced by Schirach, was as follows: — He affirms that the hive consists of three kinds of bees: 1. the queen; 2. the drones, being the males; and, 3. a middle sex, the working bees, which possess a greater affinity to the female than the male sex; which, however, are destitute of any procreating power, nor do they possess any influence in the multiplication of their species. It may be observed that Schirach was here standing on the very threshold of truth: he, however, departed widely from it in the hypothesis which he founded on the classification just given, as he affirmed that from every egg that would produce a working bee, if it remained in the small cell till its maturity and was nourished in the usual manner, a queen would always arise, if the bees gave to such egg an enlargement of the cell, in which the worm and the nymph could properly extend themselves, provided that such worm or nymph was provided with richer food, and in greater profusion. It was a part of his system, that, in the liquid nature of an egg, the parts which belonged to the queen bee lay concealed in imperceptible minuteness; but that, as soon as they received the necessary space for their expansion, an increase took place in their size; and the developement of the parts gradually proceeded, until the queen finally attained her full magnitude and beauty. Finally, he declared the working bees to be all virgins, devoted to perpetual chastity. The following, therefore, may be taken as his system: —



This system, however, met with very great opposition; for the very circumstance of the alleged existence of a fruitful common bee never procreating, nor producing any of its species, threw the whole system into disrepute, and at once established its falsity. Nevertheless, it excited considerable sensation among the entomologists of the day; and some of the opponents of Schirach extended their dissent so far as to assert that all the working bees possessed the power of procreation; and they made their appeal to the alleged fact, that hives destitute of their queen will continue the process of breeding, and even produce a brood of drones. It was, however, a part of the theory of Schirach, that the drones originated from some false and corrupted eggs; or, in other words, that they were actual abortions.

Harold was one of the greatest opponents of Schirach; and he disseminated the following system: —



According to this system, Harold maintained that the queen, as the mother bee, copulated with the males, which she sought for amongst the common bees; and from the eggs which the queen laid proceeded male and female bees. The males performed their labours exteriorly to the hive; that is, they collected honey and wax, and copulated with the queen and the female bees. The latter operated on the materials which the males brought into the hive; they built the cells, took care of the brood, and closed the cells when full of honey: in fact, they were the housewives of the hive. If these female eggs were deposited in the larger cells, then the issue was the large mother bees or queens; the female working bees copulated with the males, and the produce then was nothing but drones: these he considered as a kind of abortion, and of no sex whatever. The latter hypothesis was, however, proved to be false, by anatomical examination of the insect; and, therefore, the republic of bees was changed by some individuals into a kind of amazonian state, in which the drones, which had hitherto been considered as devoid of sex, were admitted to the rank of males or husbands. This theory found many adherents; but it was soon exploded, to make room for another, by Heinmetz, which, on account of its ingenuity, was adopted by many, as it seemed to clear away several of those obscurities in which the natural history of the bee had been hitherto enveloped. He accordingly established a double genealogical tree of the bee family.

1. The queen, or the great mother bee, who copulates with the male working bees as her lawful husbands; and then she lays,

First, *Male eggs*, from which originate insects similar to their sires. If these eggs be laid in large cells, the issue will be great male bees, if the rudiments, the germ, and the capacity to a great male bee be existing in the egg. But, however, as only small male working bees are the issue, although they may be bred in large cells, the conclusion must be drawn, that in these male eggs the germ was only existing for small working bees of the male sex, and that from them no great male working bees were produced.

Secondly, *Female eggs*. The issue of these eggs resembles the mothers: and if they be laid in cells agreeably to their nature, and are there bred and brought forth, it then follows that the issue are great mother bees or queens. If, however, these eggs be laid in cells not according to their nature, then the issue will be small female bees; and these are the mothers of the drones.

According to this genealogy, the working bees are partly male and partly female, and are indebted to the queen for their existence. On the other hand, the drones are begotten by the mother drones according to the following genealogical scale: —

The mother drones copulate with the male drones, and lay no other eggs than the drone eggs. Those drone eggs remain, *first*, either from a want of a sufficient number of great cells, or from a hidden natural instinct, or from a wise and established view of the Creator, in small and contracted cells; and are, consequently, unable so fully to develope themselves as their original disposition required. They must, however, as the germ to a great drone bee is once inherent in the egg, obtain in the progress of their growth some enlargement of their contracted cells, and, consequently, must come forth as natural drones, like their fathers: simply, however, that they appear more diminutive than their fathers, who were bred in the great regular cells of the drones. Or, *secondly*, they are bred in the regular drone cells appropriate to their nature and their original dispositions; and therefrom issue the great drone bees, *which must be considered as genuine males*, according to the result of anatomical experience.

It may be easily supposed that a system of this kind should meet with a number of opponents, and that it should be attacked on all sides with the utmost severity, at the same time that it met with many adherents. From this system, and that of Harold, another theory was raised by Privy Counsellor Voigt, in Schwarzbach, near Culmbach; and Precentor Lucas, in Nischwitz, near Würzen. According to their system, *the queen is the real mother of all the bees;* laying, during eight months of every year, an almost incredible number of fructified eggs; from which, in twenty or twenty-four days, the common working bees are bred, which, in their sexual character, are both male and female. The males, by means of their mouth, fructify not only the queen, but also their sisters, the common female bees or mother drones; and from the eggs laid by the latter, in the month of May or June, the drones are actually bred. The fructification or vivification of so many thousand eggs is wholly performed and executed by the principle of life, or by the animating creative spiritual power, the well-known *aura seminalis* contained in the spittle, which may be considered as the vehicle of it, and the process of which is so very visible in the frequent application of the proboscis of the common male bees to that of the queen.

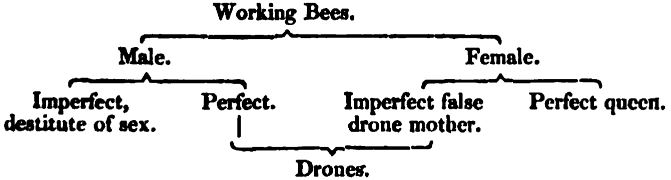
This system may, therefore, be considered as follows:—

$$\begin{array}{lcl}
 & \left.\begin{array}{c}\overbrace{\underbrace{\text{(a) Working Bees.}\quad\text{(b) Mother Bee.}}_{\text{Working Bees.}}}^{\text{Power of production and reproduction.}}\end{array}\right\} & \begin{array}{c}\text{1.}\\ \textit{Sphere of}\\ \textit{production.}\end{array}\\
\begin{array}{l}\text{1. }\textit{Absolute Nature.}\\ \\ \\ \text{2. }\textit{Relative Nature.}\end{array} & \left.\begin{array}{c}\overbrace{\underbrace{\begin{array}{c}\text{(a) Male power}\\ \text{of reproduction.}\end{array}\quad\begin{array}{c}\text{(b) Female power}\\ \text{of reproduction.}\end{array}}_{\text{Drones.}}}\end{array}\right\} & \begin{array}{c}\text{2.}\\ \textit{Sphere of}\\ \textit{reproduction.}\end{array}
\end{array}$$

For the truth of this system, an appeal is made to experience, which shows that common bees, with a queen, can compose a perfect hive, without a single drone being considered as a necessary adjunct: for, in the words of the above theorists, whoever wishes to establish a hive, let him trouble his head about the working bees and a queen, but he need not pay any attention to the drones. Experience also confirms that working bees, in the sphere of reproduction, breed drones; and that the said sphere, and the process of procreation, are performed by them, although under the influence of an absolute nature. The first, however, does not take place when, in the absence of a mother, the sphere of production is stopped, and the relative nature of their sphere of reproduction, which must then abate in its power, becomes isolated.

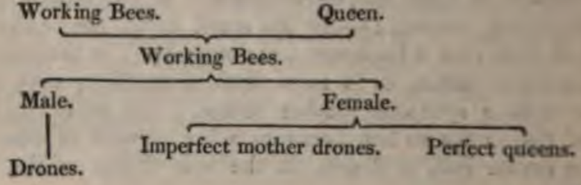
This system, however, did not long hold its ground; although it is curious to observe how gradually the light which is now diffused over the natural history of the bee peeps through these various systems, in which truth and error are so confounded, that it is a task of no small difficulty to separate them, or to arrive at any positive decision as to the adoption or rejection of their leading principles. The obscurities which distinguish the foregoing system induced Heumann, in his *Physikalisch-Oekonomische Einleitung zu einer richtigen Kenntniss der Bienen* [*Physico-Economical Introduction to a correct Knowledge of Bees*], to suppose that he could remove those obscurities; and, according to his system, the queen is the only actual mother of her like: she is also the mother of the bees and the drones; laying, in the course of the year, many thousand eggs. The bees are the nurses, who are to cooperate in the breeding; and without their assistance the eggs prove abortive. They have it, however, in their power to effect the developement of the female egg in the following manner: — In the small cells, the sexual property is lost, and it becomes a common bee; in the royal cell, it becomes a queen, or a most fruitful mother; and, in the drone cell, a spurious mother drone. The male egg in the cell of the common bee becomes a bee devoid of sex; and, in the drone cell, a drone, as the sole father of the whole family.

This system will, therefore, stand as follows: —



Although this theory found considerable support, and is, in reality, verging nearer to the truth than any of the preceding; yet it was by no means considered sufficiently explicit. Professor Hummel, in the *Bibliothek der Wissenschaften* [*Library of Sciences*], attacked it most violently, on the principle that it was at variance with every analogy of nature, to invest an insect with the power of altering the sexual character of an egg after its deposition, and to impart to it a power which did not belong to it in its original nature. The sequel will show that on this argument of Professor Hummel's is founded one of the chief objections to the hypothesis advanced by Huber, advocated by his adherents, and echoed by the editor of the volume of the *Library of Entertaining Knowledge* entitled *Insect Architecture*, that a common bee is possessed of the power of generating a queen from a common egg. It is, however, not the least interesting part of the study of the bee, that this apparently insignificant insect has hitherto baffled all the research and ingenuity of man to discover the manner of its propagation: analogy presents no guide to the solution of their secret; and the result of every anatomical experiment has tended rather to mystify the subject, than to conduct us on the road to truth.

The system of Heumann fell to the ground, upon the attack of Hummel and others; but another theorist immediately rose up, in the person of the celebrated Strube, who, taking advantage of the light thrown upon the natural economy of the bee by his predecessors, considered that by the following system he had reconciled all their contrarieties, and removed all their obscurities: —



According to this system, the queen, *with a double-branched ovarium*, lays male and female eggs; and we cannot, in this place, refrain expressing our surprise that Dr. Bevan, in his *Honey Bee*, a work emanating from the Hüberian school, and compiled with the most marked partiality, should have committed the egregious error of speaking of the *ovaria* of the queen. Strube very justly designates it as a double-branched ovarium: and if Dr. Bevan, in default of personal anatomical researches, had consulted Swammerdam, he would not so glaringly have exposed his ignorance of the internal structure of the queen bee.

The male eggs, according to Strube, are placed in the small cells, and in the first part are bred working bees: the female eggs, however, as soon as the bees have brooded some of them in acorn-formed cells, become queens, which can breed both sexes, and from them spring the principal race of all the chief mother bees. The majority, however, of these female eggs are placed in small cells, and are bred as degraded queens. The remaining part of the working bees are those which, in the end, are only able to breed drones. The fructification of the queen is performed by the male working bees, and not by the drones: the drones, which are bred in the middle of the month of May, derive their existence from the degraded queens. The ovarium of these female bees cannot properly develope itself in the small cells; independently of which, they are in their nature considerably weakened. The impulse to breeding becomes thereby greatly moderated; and it is only in the warm months, that the freshness of the honey and the heat of the hive instigate these weak imperfect mothers to propagation. They mingle with the few drones which are at this time to be found in the hive, and contribute to the population of the republic. *The eggs from which the first drones arise are laid towards the end of autumn; and, as during the winter they lie beyond the central heat of the hive, they do not develope themselves before the spring.* It is only when there is a deficiency of male working bees that the queen is fructified by the drones.

(*To be resumed.*)

Art. V. *An Introduction to the Natural History of Molluscous Animals.* In a Series of Letters. By G. J.

Letter 10. *On their Secretions.*

(*Continued from* p. 43.)

This letter you may properly consider as a continuation of the preceding (p. 31.); for the blood is the material out of which not only the growth and repairs of animal bodies, but likewise all the secretions, are directly derived; the latter obtaining their peculiar properties from differences in the structure and action of the various glands or vessels through which they percolate.

1. The most important and general secretion of molluscous animals is *shell*; but I have already had occasion to write so

fully of its constitution and formation [Letter 5., in Vol. III. p. 335—348.], that at present I shall confine myself to some additional remarks on *internal* shells, or such as are constantly covered by the cutaneous envelopes. So far as I remember, all of these are white, and generally thin; but they do not differ from other shells in their composition, unless we include among them the horny plates which strengthen the back of some Cephalopodes (*L*olìgo), or protect the viscera of a few of the Gasteropodes (*L*ìmax); for these contain very little, if any, cretaceous matter. The plate of the slugs, which lies under the shield on the anterior part of the body, has been called the snail's stone, and used to be esteemed a serviceable medicine in the gravel and strangury. It varies in size and consistency in the different species; a fact of which Swammerdam does not seem to have been aware; for, to account for large slugs having "very small and membranous" plates, while smaller ones had them often much larger, and formed of "solid stone," he was inclined to think "that the snails change this their little stone yearly, in the same manner as crawfish change those two semiconvex and plain stones, which are likewise placed in their thorax, and are improperly called crab's eyes." (*Book of Nature*, p. 71.) But the most interesting of internal shells are, the Spírula Peròn*ii* of Lamarck, and what is commonly called cuttlefish bone. The former (*fig.* 104. *b*) is a pretty multilocular species, rolled up in a spiral form, which lies partially embedded in the posterior part of a Cephalopode (*a*) that inhabits many warm seas; the latter is a calcareous production, of so singular a structure, that, according to Cuvier, it is unexampled in the animal kingdom, and may, therefore, merit a detailed description. The bone is placed in the back of the cuttlefish (*Sè*pia officinàlis), within a membranous capsule, from the inner surface of which it is secreted, but with which it has no connection further than a slight adhesion from contact; for neither blood-vessels nor nerves penetrate the interior, and it is truly as unorganised, and as little within the influence of the living powers, as other shells are. In the very young *Sè*piæ, the bone is horny; but in the mature cuttle it is entirely calcareous, if we except a thin membranous border. It is very light, of an elliptical figure, upwards of 6 in. in length, and not quite 3 in. in

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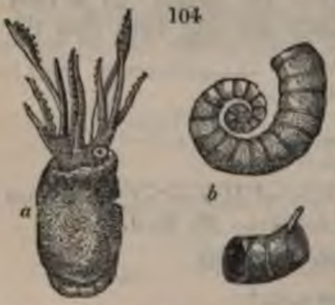

breadth; slightly convex on the back, and considerably protuberant on the anterior side, where it is so soft that the nail, applied with a moderate force, cuts it easily. The figure *a* (*fig.* 105.) is a front view of this production, reduced to nearly two ninths of the natural size: the convexity is greatest in the middle, whence it gradually declines towards both ends; the upper half being smooth and obtuse, while the lower is marked with imbricated curved lines, and contracts rather suddenly to a narrow point. But this point is surrounded with a broad prominent concave border, consisting of two portions closely united: the first opaque, and scored longitudinally with fine lines; the other perlaceous, and faintly lined transversely. The latter is continued not only along the margins, but extends over the whole opposite surface (*b*), which, from this circumstance, is much harder than the anterior; and it is also all over roughened with slightly raised knobs or granulations, arranged in obscure curved lines. To complete the view, I give two sections of the bone (*c*, a perpendicular, and *d*, a transverse, section), which will likewise disclose in part the internal structure. You perceive that the bellied portion is composed of very thin parallel and convex plates, which run slopingly from the anterior to the posterior surface; and that the intermediate spaces are filled with a much less compact material, formed of fibres in a crystalline state, placed perpendicularly, as is more clearly exhibited in the following figures (*e* and *f*). The plates are of unequal lengths; the lowermost, which are also the first formed, being the shortest, while those of the latest formation are the longest: and yet, however, they cover only half of the whole surface. The fibres of the intermediate substance are loosely connected together by other fibres running in the direction of the longitudinal plates, as is very obvious when a small and thin section is viewed through a magnifier (*f*): the

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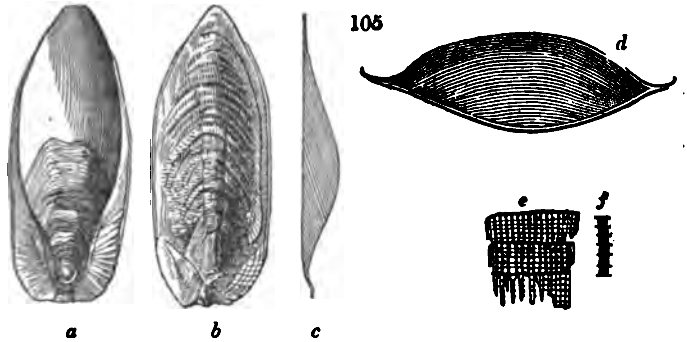

perpendicular fibres themselves are marked with many cross lines, and they are thickish, and of equal lengths (*e*), Cuvier says, positively, that they are little hollow columns, placed in a quincunx order (*Mém.*, vol. i. p. 47.); but, according to Dr. Fleming, this is an erroneous account; and he describes them as "narrow laminæ," which, when viewed laterally, appear like fine parallel threads; but, when examined vertically, are found to be waved, and fold upon themselves. Next the plate they are thin, and not much flattened; but towards their other extremity they become thicker, striated across, and more folded, with irregular margins," (*Phil. of Zool.*, vol. ii. p. 436.); and this description agrees pretty exactly with my own observations.

2. *Pearl* is another calcareous secretion of molluscous animals deserving notice. It is secreted only by the fish of bivalves; and principally by such as inhabit shells of foliated structure, as sea and freshwater muscles, oysters, the *Pinnæ*, &c. A pearl consists of carbonate of lime, in the form of nacre, and animal matter arranged in concentric layers around a nucleus, as it is well shown in our figure (*fig.* 106.), copied from a beautiful engraving appended to a paper of Sir E. Home's in the *Philosophical Transactions*. Each layer is presumed, but I know not on what grounds, to be annual; so that a pearl must be of slow growth, and those of large size can only be found in full-grown oysters. "It is the nacral lining of the central cell that produces the lustre peculiar to the pearl, which cannot be given to artificial ones." *

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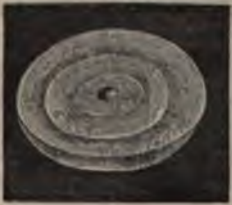

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* In a previous letter [Letter 5., Vol. III. p. 346.] it is stated that Dr. Brewster had proved the peculiar lustre of the pearl to be the effect of light reflected from the surface; an opinion first entertained, I believe, by the celebrated Robert Hooke. "Which, by the way, may hint us the reason of that so much admired appearance of those so highly esteemed bodies (pearls), as also of the like in mother-of-pearl shells, and in multitudes of other shelly sea-substances; for they each of them, consisting of an infinite number of very thin shells or laminated orbiculations, cause such multitudes of reflections, that the compositions of them, together with the reflections of others that are so thin as to afford colours (of which I elsewhere give the reason), give a very pleasant reflection of light: and that this is the true cause seems likely, first, because all those so appearing bodies are compounded of multitudes of plated substances; and, next, that, by ordering any transparent substance after this manner, the like phenomena may be produced. This will be made very obvious by the blowing of glass into exceeding thin shells, and then breaking them into scales, which any lampworker will presently do; for a good quantity of these scales, laid in a heap together, have much the same resemblance of pearls."

Pearls, as Mr. Gray justly observes, are merely the internal nacred coat of the shell, which has been forced, by some extraneous cause, to assume a spherical form. They are, therefore, not properly " a distemper in the creature that produces them," and cannot, under any view, be compared with calculi in the kidneys of man (Lister, *Hist. An. Ang.*, p. 150.); for, though accidental formations, and, of course, not always to be found in the shellfish which are known usually to contain them, still they are the products of a regular secretion, applied, however, in an unusual way, either to avert harm or allay irritation. That in many instances they are formed by the oyster, to protect itself against aggression, is evident; for, with a plug of this nacred and solid material it shuts out worms and other intruders which have perforated the softer shell, and are intent on making prey of the hapless inmate: and it was apparently the knowledge of this fact that suggested to Linnæus his method of producing pearls at pleasure, by puncturing the shell with a pointed wire.* But this explanation, it is obvious, accounts only for the origin of such pearls as are attached to the shell; while we know that the best and the greatest number, and, indeed, the only ones which can be strung, have no such attachment, and are formed in the body of the animal itself. " The small and middling pearls," says Sir Alexander Johnston, " are formed in the thickest part of the flesh of the oyster, near the union of the two shells; the large pearls almost loose in that part called the beard." (Home's *Lect. Comp. Anat.*, vol. v. p. 308.) Now, these may be the effect merely of an excess in the supply of calcareous matter, of which the oyster wishes to get rid; or they may be formed by an effusion of pearl, to cover some irritating and extraneous body. The reality of the latter theory is, perhaps, proved by a practice of the modern Chinese, who force the swan muscle (A´nodon *cýgneus*) to make pearls, by

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(*Micrographia*, p. 209., folio, 1667.) Sir E. Home disproves this explanation of Hooke and Brewster, so far as the same is applied to pearls, by the following experiment: — " Upon taking a split pearl, and putting a candle behind the cell, the surface of the pearl became immediately illuminated; so that the fallacy of my philosophical friend's opinion was made self-evident.... The error my friends fell into was, taking for granted that the pearl was a solid body; and therefore, considering the subject mathematically, the brilliancy must be produced by the reflection from the nacral surface; but this reasoning was entirely inapplicable when applied to a sphere that is hollow." (*Lectures on Comp. Anatomy*, vol. v. p. 306., and *Phil. Trans.* 1826, part iii. p. 339.)

* Lin. Corresp. by Smith, vol. ii. p. 429. Pearls formed somewhat in this manner, by the freshwater muscle, are preserved in the Hunterian Museum. Home's Lect. Comp. Anat, vol. vi. p. 296.

throwing into its shell, when open, five or six minute mother-of-pearl beads strung on a thread: in the course of one year, these are found covered with a crust which perfectly resembles the real pearl.* The extraneous body which naturally serves for the nucleus, appears to be very often, or, as Sir E. Home says, always, a blighted ovum. Christophorus Sandius, in 1673, on the authority of Henricus Arnoldi, "an ingenious and veracious person," asserted that the ova left unexpelled from the shell became the nuclei on which pearls, in the freshwater muscle, were formed. "Sometimes," he says, "it happens that one or two of these eggs stick fast to the sides of the matrix, and are not voided with the rest. These are fed by the oyster against her will; and they do grow, according to the length of time, into pearls of sufficient bigness, and imprint a mark both on the fish and the shell, by the situation, conform to its figure." This theory has been fully adopted by Sir E. Home, from whose paper I have made the above quotation. "If," says the enthusiastic baronet, "I shall prove that this, the richest jewel in a monarch's crown, which cannot be imitated by any art of man, either in the beauty of its form or the brilliancy and lustre produced by a central illuminated cell, is the abortive egg of an oyster enveloped in its own nacre, of which it receives annually a layer of increase during the life of the animal, who will not be struck with wonder and astonishment?" (*Comp. Anat.*, vol. v. p. 302.) And, as proofs of this, he informs us that he has always found the seed pearls in the ovarium, or connected with that part of the shell on which the ovarium lay; and he has discovered that all Oriental pearls have a brilliant cell in the centre, of a size exactly large enough to contain one of the ova. "From these facts, I have been led to conclude that a pearl is formed upon the external surface of an ovum; which, having been blighted, does not pass with the others into the oviduct, but remains attached to its pedicle in the ovarium, and, in the following season, receives a coat of nacre at the same time that the internal surface of the shell receives its annual supply. This conclusion," he adds, "is verified by some pearls being spherical; others having a pyramidal form, from the pedicle having received a coat of nacre as well as the ovum." (*Phil. Trans.*, 1826, part iii. p. 339.)

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* The Chinese appear to have more ways than one of getting artificial pearls. Sir E. Home says their method is this:—"They take the substance of the clamp-shell, turn it in a lathe into hemispheres of different sizes, and introduce them through the shell of the oyster, with the convex surface towards the animal; the prominent part is, consequently, covered with nacre, and annually receives an increase. By introducing hemispheres instead of spheres, they avoid irregularities on the opposite surface. In this manner half pearls are made, since they cannot make whole ones; and when these are set to represent pearls, they will pass off undiscovered by an unexperienced eye, but not by those who understand pearls, being deficient in lustre." (*Comp. Anat.*, vol. v. p. 296.) Mr. Gray, however, has proved that this people introduce, for the same purpose, pieces of mother-of-pearl "between the leaf of the mantle and the internal coat of the shell; for they could not have been put in through a hole in the shell, as there was not the slightest appearance of any injury near the situation of the pearls on the outer coat." Mr. Gray tried the experiment on our freshwater muscles, by introducing pieces of mother-of-pearl between the mantle and the shell; but with the result I am not acquainted. He adds:—"If this plan succeed, which I have scarcely any doubt it will, we shall be able to produce any quantity of as fine pearls as can be procured from abroad." (Home's *Lectures*, vol. v. p. 300, 301.) The original paper is in the *Annals of Philosophy*, for, I believe, January, 1825.

I will conclude what I have to say concerning pearls, with the following extract from the paper of Mr. Gray quoted in the preceding page: — "The pearls are usually of the colour of the part of the shell to which they are attached. I have observed them white, rose-coloured, purple, and black; and they are said to be sometimes of a green colour.* They have also been found of two colours; that is, white with a dark nucleus, which is occasioned by their being first formed on the dark margin of the shell before it is covered with the white and pearly coat of the disk, which, when it becomes extended over them and the margin, gives them that appearance.

"Pearls vary greatly in their transparency. The pink are the most transparent; and in this particular they agree with the internal coat of the shell from which they are formed; for these pearls are only formed on the *Pinnæ*, which internally are pink and semitransparent, and the black and purple specimens are generally more or less opaque.

"Their lustre, which is derived from the reflection of the light from their peculiar surface produced by the curious disposition of their fibres, and from their semitransparency and form, greatly depends on the uniformity of their texture and the colour of the concentric coats of which they are formed. That their lustre does depend on their radiating fibres, may be distinctly proved by the inequality of the lustre of the 'Colombian pearls,' which are filed out of the thick part near the hinge of the pearl oyster (Avícula margaritífera), so that they are formed, like that shell, of transverse laminæ, and they consequently exhibit a plate of lustre on one side which is usually flat, and are surrounded by brilliant concentric zones, which show the places of the other plates, instead of the even, beautiful, soft lustre of the true pearls."

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* "There are, besides, (in Britain,) several sorts of shellfish, among which are muscles, containing pearls often of the best kind, and of every colour; that is, red, purple, violet, green (prasini), but principally white, as we find in the Venerable Bede's *Ecclesiastical History.*" (*Richard of Cirencester*, transl. p. 28.) Philosophy has destroyed many a fine hypothesis, as witnesses the following, explanatory of the variations in colour of these bodies: —

"With open shells in seas, on heavenly dew,
  A shining oyster lusciously doth feed;
  And then the birth of that ethereal seed
Shows, when conceived, if skies look dark or blue:
Pearls, then, are orient-framed, and fair in form,
  If heavens in their conception do look clear;
But if they thunder, or do threat a storm,
  They sadly dark and cloudy do appear." *Drummond.*

(*Note by G. J.*)

3. I have, in a former letter [Letter 5., Vol. III. p. 345—347.], said as much as seems necessary concerning the colour of shells: but this may be not an improper place to introduce such facts as I have collected relative to the colour of the animals themselves; for their colours depend on the secretion and deposition of a colouring matter in the mucous coat of the skin. Most shellfish are of a uniform white, a straw, or a greyish colour; and the dark spots with which they are clouded are almost always occasioned by the opacity of the internal viscera or their contents. There are, however, many exceptions to this remark; and these would be still more numerous, were our acquaintance with the inmates of shells more extensive and accurate than it unfortunately is. The animal of our native cowry (Cypræ̀a europæ̀a) is a most elegant creature (*fig.* 107. *a*, viewed laterally; *b*, from beneath), whose splendid colours are, according to my friend Dr. Coldstream, unrivalled amongst the Gasterópoda. The proboscis is dark vermilion; the tentacula yellowish red, spotted with yellow; the upper part of the foot streaked longitudinally with yellow and brown; and the mantle greenish brown, edged with brownish red: but, notwithstanding, the shell is a uniform dull white. Similar discrepancies between the colour of the shell and its owner are often met with: thus, the Cypræ̀a Volùta of *Montagu* (Marginélla Volùta *Fleming*) has its fins or lateral expansions elegantly speckled with bright yellow, and the fleshy parts of its body with pink. (Montagu, *Test. Brit.*, p. 204.) The long proboscis of the Strómbus pès Pelicàni *Lin.* is pink, dotted over with milk-white spots; and the animal of the white Scalària clàthrus is

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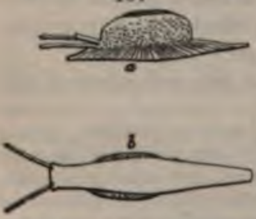

mottled black and white. Mr. Collier says, of some tropical species, that the foot is "blackish red in the *Mùrices* generally; green in *S*trómbus, and some species of *T*ròchus; black in Búlla òvum; deep red with faint designs, like those of the shell, in Cònus *tùlipa*, marmòreus, and its varieties; spotted, in *B*úccinum *Hárpa*; bright yellow, in *B*úccinum Cássis; mottled, in Olìva; and deep brown, from spots, in some species of Volùta." (*Edin.Phil. Journ.*, Oct. 1829, p. 228. The names used by Mr. Collier are those of Linnæus.) The snail of the beautifully marbled harp shell (*Hárpa* ventricòsa *Lamarck*) glories in a rich vermilion red skin. "In the Mauritius, it is the amusement of the place, to watch over the trim apparatus of lines hung over some sand-bank to tempt the various brilliant species of Olìva, which there abound, or to wait for the more rare approach of the harp shell, till the rich hues of its inhabitant are seen glowing through the clear blue water, in the rays of a tropical rising sun." (Broderip, in *Zool. Journ.*, vol. ii. p. 199.)

The colours of the naked Mollúsca are very various: there are black, white, grey, brown, yellow, red, and even green species; and the colours are sometimes uniform and single, but more commonly mixed, and disposed in freckles or clouds. To dwell, however, on such a subject would be useless; and I pass on to notice the very curious phenomena exhibited in the coloured spots of the Cephalópoda.

The surface of these remarkable creatures, particularly the back and sides, is speckled with numberless minute coloured dots, which vary in size, tint, and arrangement, in the different species; and in the same species are liable to change, in the same respects, according to their degree of developement. These dots are properly follicles, or little bladders, seated in the mucous web (rete mucosum), and, consequently, covered by the epidermis, which is smooth and transparent. "During life, when the animal is in a state of repose, the vesicles are contracted, and are not visible. When it is excited, by being touched with the hand, or otherwise irritated, the coloured vesicles show themselves, and are instantly in motion, appearing and disappearing with the velocity of lightning: sometimes they are like spots on different parts of the body; and sometimes like waves, which rapidly move across its surface." These appearances are produced "by the rapid and simultaneous contraction which takes place in all the vesicles of a particular part of the body, and from the sudden and simultaneous expansion of all the vesicles on another part;" but the process may go on until the whole body is covered, and its natural colour become changed for that of the vesicles.

Even long after death, these vesicles may be made to exhibit the same alternate contractions and expansions, on the application of slight irritations.

Naturalists have been long acquainted in some degree with these singular phenomena. Pliny tells us that the cuttlefish change their colour through fear (*Hist. Nat.*, lib. ix. cap. 46.); adapting it, cameleon-like, to that of the place they are in. None of the older authors, however, attempted to investigate their cause; but, of late, several theories have been offered, and two of these are founded on a minute enquiry into the structure of the vesicles. Cuvier said, conjecturally, that the appearances were dependent on the effusion of a coloured fluid in the areolar tissue of the skin; and Professor Grant refined upon this hypothesis, by supposing the fluid to pass repeatedly to and from the minute vesicles (*Edin. New Phil. Journ.*, vol. xvi. p. 313.): but this conjecture has been fully disproved; for the spots have no connection with any vascular system, nor do the vesicles contain any encysted fluid. Dr. G. San Giovanni of Naples, an intelligent comparative anatomist, offered another explanation, founded on a connection between the vesicles and the nervous system, which he imagined he had traced. The colour is correctly stated to be inherent in the tissue itself; and its changes are attributed to the particular structure of the vesicles, each of which, he says, has a circular aperture that opens and shuts, probably by means of a circular muscle, the actions of which are regulated by the will of the animal, through the medium of the nerves, with which the vesicles are connected by means of delicate filaments, scarcely discernible even with the aid of a microscope. But the observations of Dr. Coldstream, one of the most promising among the rising race of naturalists, destroy this ingenious and plausible theory. Dr. Coldstream could not discover, by the most careful microscopic examination, the slightest trace of any nervous threads in connection with the vesicles; and he proved, which seems incompatible with their dependence on the nerves, that the vesicles possessed motion in pieces of the mucous coat which had been removed entirely from the body: nor could he succeed in discovering any opening in them, such as San Giovanni asserts they have, even during their greatest dilatation, and under the most favourable circumstances. "That I might ascertain," to use Dr. Coldstream's own words, "whether or not the motions of the spots were now (after apparent death had taken place) carried on by the influence of external agents, independently of any nervous power emanating from the animal itself, I cut, from a part of the mantle where the contractions and dilatations were very strong, a piece of the membrane or layer containing the spots, about two tenths of an inch square; this I separated completely from the animal, and placed it in a watch-glass immersed in sea-water in another vessel. To my astonishment, I saw that the spots in the separated portion continued in as lively motion as when connected with the animal. No change, either in the velocity or extent of their motions, could be perceived. Some spots, just on the edges of the separated piece, seemed to have been half cut through by the scissors with which I removed it: such did not contract; but all the others in the piece moved in the very same manner as before.

" I now removed the watch-glass, containing the separated portion, to the stage of a microscope, and examined the spots with powers of 100 and 150. This, however, gave me no advantage; I saw nothing more than I had previously observed with the naked eye. San Giovanni has compared the appearance of the structure of the spots to that of felt; but I could not satisfy myself that this was the case in those examined, although I passed through the membrane a very strong light. I saw that the spots were very thin bodies, attached to the mucous coat of the integument; that they had no connection with the epidermis; that, in dilating, their edges passed over or under each other indiscriminately; that their edges were extremely sharp and well defined; that they never were increased in thickness during dilatation; and that no vessels carrying coloured fluids entered them. I could not discover, indeed, any thing like either vessels or nervous filaments connected with any part of the integument of the animal; and I feel assured, that, from the great size of some of the spots which I had under the microscope, I must have seen at least a few vessels carrying dark-coloured fluids entering the mucous coat, had it been from such a source that the increase in size of the spots was derived.

" The separated piece of the mucous coat, with the palpitating spots, remained under my microscope, exposed to a strong reflected light, for three quarters of an hour, during which time I could perceive no alteration in its appearance, or the strange phenomena it presented. While the motions of the spots were very brisk, I suddenly removed it to a dark place, where it remained fifteen minutes. On bringing it again to the light, I found that all motion had ceased; most of the spots were in a state of contraction; but, on allowing it to remain for three minutes exposed to a moderately strong light, the dilatations again commenced, and were carried on unceasingly for a very considerable time. I repeated these experiments with other pieces of the spotted membrane, and always with similar results. At the end of nearly two hours from the time when some of them were removed from the animal, the spots were dilating; but, in the course of a few minutes afterwards, motion finally ceased." [*]

4. It has been conjectured, that the peculiar property in the skin of the Cephalópoda, just described, is given to them as a means of defence: but the conjecture seems to have been hazarded merely to satisfy the craving wish, which we all entertain, to know the uses or final cause of things that pass under our observation; for I know no experiments or facts that tend to give it stability: and, if the opinion is just, then the cuttles would seem to be doubly armed; for, when in danger, they are said to eject a copious black liquor through their funnel or excrementary canal, as a means of obscuring the circumfluent water, and concealing themselves from all foes: —

> " Long as the craftie cuttle lieth sure
> In the blacke cloud of his thicke vomiture." [†]

This inky fluid is a very remarkable secretion, produced in a bag that lies near the liver, and sometimes even embosomed in it, and communicating with the funnel by means of its own excretory duct. The interior of the bag is not a simple cavity; it is filled with a soft cellular or spongy substance, in which the ink is diffused. This has no relation or analogy with bile, as Munro believed; but it is a peculiar secretion, somewhat glutinous, readily miscible with water, and variable in point of shade, according to the species of cephalopode from which it comes; so that, as Dr. Grant remarks, a more intimate acquaintance with this character might be useful in tracing relations among the different species. The colour of the ink in *L*olìgo sagittàta [*] is a deep brown, approaching to yellowish brown when much diluted, and corresponds remarkably with the coloured spots on the skin of that species; but in Octòpus ventricòsus the colour of the ink is pure black, and it is blackish grey when diluted on paper. "The ink (*Edin. Phil. Journ.*, vol. xvi. p. 316.) brought in a solid state from China has the same pure black colour as in the Octòpus ventricòsus, and differs entirely in its shade, when diluted, from that of the *L*olìgo sagittàta, as may be seen from specimens of these three colours on drawing paper. Swammerdam suspected the China ink to be made from that of the *S*èpia; Cuvier found it more like that of the Octòpus and *L*oligo; but different kinds of that substance are brought from China, probably made from different genera of these animals, where they abound of gigantic size." At the present day, according to Cuvier, an ink is prepared from the liquor of these animals in Italy, which differs from the genuine China ink only in being a little less black. (*Mem.*, vol. i. p. 4.) Davy found it to be "a carbonaceous substance mixed with gelatine;" but, on a more careful analysis, Signor Bizio procured from it a substance *sui generis* [peculiar in kind], which he calls melania. "The melania is a tasteless, black powder, insoluble in alcohol, ether, and water, while cold, but soluble in hot water: the solution is black. Caustic alkalies form with it a solution even in the cold, from which the mineral acids precipitate it unchanged. It contains much azote: it dissolves in, and decomposes, sulphuric acid: it easily kindles at the flame of a candle: it has been found to succeed, as a pigment, in some respects better than China ink." (*Edin. Phil. Journ.*, vol. xiv. p. 376.)

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[*] Edin. Journ. Nat. and Geogr. Science, vol. ii. p. 296. The paper from which the above extract is taken contains the best account which has yet been published of these coloured vesicles, or " chromophorous globules," as they have been termed. The reader may also consult the *Edin. Phil. Journ.*, vol. xi. p. 422.

[†] " The ink secreted in this bag has been said to be thrown out to conceal the animal from its pursuers; but, in a future lecture, I shall endeavour to show that this secretion is to answer a purpose in the animal economy connected with the functions of the intestines." (Home's *Comp. Anat.*, vol. i. p. 376.) Dr. Coldstream, in a letter to the author, detailing the manners of Octòpus ventricòsus in captivity, says, " I have never seen the ink ejected, however much the animal may have been irritated." I have, however, been told by our fishermen, that they have seen this species eject the black liquid, with considerable force, on being just taken from the sea.

[‡] Sir R. Sibbald says that the *Loligo*, or hose-fish, besides its ink, has another purple juice. (*Scot. Illust.*, vol. ii. lib. 3. p. 26.) I find no mention of this in any other author.

5. Several of the Gasteròpoda secrete a liquor analogous, in some respects, to the ink of the cuttlefish. The Aplýsiæ pour out at will, or when molested, an abundance of a beautiful purple fluid; so that a single individual can colour the water for some yards around it. This fluid is secreted in a gland of a triangular figure, situated under the base of the fleshy coverlid of the branchiæ, and oozes out from all the free surface of this coverlid. Cuvier says, that, in drying, the secretion assumes the beautiful deep hue of the sweet scabious (Scabiòsa atro-purpùrea *Lin.*), and remains unaltered by long exposure to the air. Nitric acid, in small quantity, heightened the tint, but a larger dose changed it to a dirty aurora; and potash changed it to a dirty vinous grey colour: both the acid and alkali precipitated many white flakes from the fluid. The smell is faint: there is nothing peculiar in the taste; nor has it any irritating quality, for it may be applied a long time to the skin with perfect impunity." (*Mém.*, vol. ix. p. 7.)

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The excretion which approaches apparently nearest to this in its character is that of the Iánthinæ; but I am not aware that any analysis has been made of it. Planórbis córneus (*fig.* 108.), also, when irritated by any means, or, as Wallis translates a passage from Lister, by "an injection of a grain of salt, pepper, or ginger, into its mouth," pours forth a purple fluid from the sides, between the fork and margin of the cloak; but the colour is of so fugitive a nature, that no acid or astringent has hitherto been found sufficient to preserve the elegancy of its tint, and from turning to an unpleasant rusty hue.* In this respect it agrees with the liquor discharged by Scalària clàthrus, of which Montagu has given us an interesting history. "The purple juice," he tells us, "may be collected either from the recent or dried animal, by opening the part behind the head; and as much can be procured from five individuals, as is sufficient, when mixed with a few drops of spring water, to cover half a sheet of paper." Neither volatile nor fixed alkali materially affects it; mineral acids turn it to a bluish green, or sea-green; sulphuric acid renders it a shade more inclining to blue; vegetable acids probably do not affect it, since cream of tartar did not in the least alter it. These colours, laid on paper, were very bright, and appeared for some months unchanged by the action of the air, or the sun; but, being exposed, for a whole summer, to the solar rays, in a south window, they almost vanished. The application of alkali to the acidulated colour always restored it to its primitive state, and it was as readily changed again by mineral acid: in this particular it differs materially from the succus of *Búccinum* lapíllus, which, as we have before remarked, is unalterable." (Mont., *Test. Brit. Sup.*, p. 122.)

It is from the difference pointed out, in the latter part of the sentence just quoted, between the fluid of Scalària (and, I may add, of Iánthina and Aplýsia), and the *Búccinum* or Purpuríferæ, and because it is from the first of a purple colour, that I cannot agree with Colonel Montagu, and many other naturalists of eminence, in their opinion, of its having formed any part of the Tyrian dye; for unchangeableness was one of the characters that enhanced the value of the latter; and Aristotle and Pliny state expressly that the colour of that fluid, on its first discharge from the animal, was white. Such a coloured liquor can be procured, as these authors say it was procured, from several univalves belonging to the genera *Mùrex* and *Púrpura*; and Colonel Montagu furnishes us with a good account of it in the *Púrpura* lapíllus: — "The part containing the colouring matter is a slender longitudinal vein, just under the skin on the back, behind the head, appearing whiter than the rest of the animal. The fluid itself is of the colour and consistence of thick cream. As soon as it is exposed to the air, it becomes of a bright yellow, speedily turns to a pale green, and continues to change imperceptibly, until it assumes a bluish cast, and then a purplish red. Without the influence of the solar rays, it will go through all these changes in the course of two or three hours; but the process is much accelerated by exposure to the sun. A portion of the fluid, mixed with diluted vitriolic acid, did not at first appear to have been sensibly affected; but, by more intimately mixing it in the sun, it became of a pale purple, or purplish red, without any of the intermediate changes. Several marks were now made on fine calico, in order to try if it was possible to discharge the colour by such chemical means as were at hand; and it was found that, after the colour was fixed at its last natural change, nitrous no more than vitriolic acid had any other effect than that of rather brightening it: aqua regia, with or without solution of tin, and marine acid, produced no change; nor had fixed or volatile alkali any sensible effect. It does not in the least give out its colour to alcohol, like cochineal, and the succus of the animal of Túrbo (Scalària) clàthrus; but it communicates its very disagreeable odour to it most copiously, so that opening the bottle has been more powerful in its effects on the olfactory nerves than the effluvia of assafœtida, to which it may be compared. All the markings which had been alkalised and acidulated, together with those to which nothing had been applied, became, after washing in soap and water, of a uniform colour, rather brighter than before, and were fixed at a fine unchangeable crimson." (*Ibid.*, p. 106.)

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* Wallis, *Nat. Hist. North.*, vol. i. p. 371. Lister, in his *Anim. Ang.*, p. 144., gives a full and very good account of this liquor.

6. Blainville seems to be of opinion that the coloured secretions now noticed are analogous to the urinary secretion of vertebrated animals (*Manuel*, p. 160.); but, of the correctness of this, doubts may be very reasonably entertained. Besides their purple fluid, the Aplŷsiæ occasionally discharge, but in small quantities, a whitish acrid one, secreted by a gland composed of little round hyaline grains, and emitted by a circular hole that opens externally a little behind the aperture of the oviduct. (Cuvier, *Mém.*, vol. ix. p. 24.) The *Dòris* ejects a similar fluid, which, however, comes from the liver, or from a gland so intimately associated with it as not

to be separated by any dissection (*Ibid.*, vol. v. p. 16.); and this excretion, which is common to many other naked mollusca, will probably be found to be the urinary discharge. In some univalved mollusca, the source of this discharge has been ascertained. Swammerdam detected in the snail a little oblong triangular part, placed near the heart, which he calls the "sácculus calcàreus." This organ has a pretty large duct, which runs into the intestine; and Swammerdam believes it to be a gland whereby the calcareous matter of the blood is drained from the body, and deposited in the intestine; "and accordingly we find that such a matter is sometimes mixed with the excrements." (*Book of Nature*, p. 49.) The organ is found, in a modified shape, in many other mollusca; and some naturalists [*] have imagined that the shell was formed by it, misled apparently by the name given by Swammerdam; for no opinion was ever more groundless or hastily offered. Cuvier considers it as the source of the mucus which snails excrete so profusely when forced to withdraw suddenly into their shells, and with which they fix their shells to smooth bodies (*Mém.*, vol. xi. p. 26.): but Mr. Jacobson has proved that it performs the functions of a kidney. "Chemical analysis of the matter secreted by this organ, has led him to discover in it uric acid, ammonia or calcareous salt, and water. His experiments were made on the great snail (Hèlix pomàtia). He was unable to discover any trace of uric acid in any other part of the animal. And as, in the superior animals, the kidneys are the only organs which, in a state of health, secrete uric acid; and as the calcareous sac of the snails has many other anatomical relations with the kidneys, Mr. Jacobson concludes that this sac represents the kidneys, and must be so considered in all the mollusca which are provided with it." (*Edin. Journ. Nat. and Geogr. Science*, vol. iii. p. 325.)

7. All molluscous animals excrete a mucous fluid to lubricate the skin, furnished by the skin itself, or by some crypts situated in it.[†] This mucus is, in general, possessed of no

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[*] "The formation of the calcareous matter of their shells, which takes place in a peculiar viscus lying near the heart (sácculus calcàreus *Swamm.* glàndula testàcea *Poli*)." Blumenbach's *Man. Comp. Anat.*, p. 251. transl.

[†] "In the gasteropodous mollusca of the genera *Lìmax*, Arìon, Hèlix, and Bùlimus, we find under the mouth, between the two inferior lips, and the protuberance of the disk of the foot, the orifice of a canal, hitherto unobserved, which runs along the whole of the foot. This anatomical arrangement is not very distinct in the genus Succínea, which approaches nearer to the Lymnæ`æ in internal structure. In the Arìon empiricòrum, which is entirely black, we perceive a trace of this canal, which appears in the form of a whitish band. The canal is not simple; it receives many little ducts, which come from the muscular sac in which the viscera are

remarkable properties, but in the Octòpus moschàtus it is probably the source of the musky smell,

"An amber scent of odorous perfume," *

which that cuttle exhales so strongly as to fill quickly a whole apartment, whether the animal be dead or alive, and whence it derives its specific designation. A native species of Hèlix (H. alliària, smells at times strongly of garlic. "When fresh taken," says Dr. Turton, "it diffuses an odour exactly like the smell of garlic, so powerful that two or three of them will scent a room for some hours" (*Land and Freshwater Shells*, p. 56.); and, according to Mr. Sheppard, the collector may frequently be guided to its retreat by this exhalation (*Lin. Trans.*, vol. xiv. p. 160.); so that what Nature doubtless intended as a beneficial gift, will often prove its bane in these evil days. I was once a collector, and have often taken this snail; but at no time have I perceived the smell, until I had plunged the shell into boiling water; and even then, according to the experiments of Dr. Johnston, the smell is not always obvious. "Four specimens of equal size," says that gentleman, "and alike in colour, and in the number of their whorls, were taken from beneath one stone. None of them had any smell while alive: but, on immersing them, one by one, in hot water, two emitted a very strong alliaceous smell, in one it was faint, and in the other it was not perceptible. It would appear, therefore, that the animal has the power of retaining or emitting its peculiar odour at pleasure; and that, in death, its emission may be prevented by accidental circumstances. I could not satisfactorily ascertain its source; but it appeared to arise from a yellowish fluid, pressed out from above the head." (*Edin. Phil. Journ.*, vol. xix. p. 77.)

8. A phosphoric fluid is secreted by several mollusca. Linnæus tells us, on the authority of Bartholinus, that, when the Octòpus vulgàris is opened in the dark, a light so strong and splendid is emitted, as perfectly to illuminate the room. (*Syst. Nat.*, p. 658.; edit. dec.) I am not aware that any gasteropode is phosphorescent; but the Phólades, among

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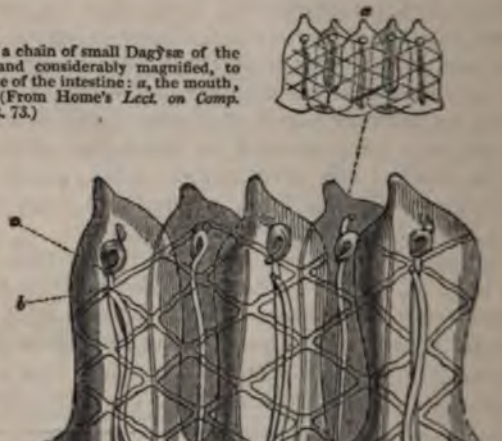
contained. In the Bùlimus ovàtus *Brug.* a little gland, which has not been described, opens into this canal; it is of the size of a bean, trilobate, granulated, and situated under the œsophagus and the inferior ganglion of the cerebral ring, so that it is surrounded by nervous filaments passing from this ganglion. The distribution of all the ducts may be easily observed when filled with mercury: M. Kleaberg names them mucous ducts, but he has not been able to determine their use and importance." (*Edin. Journ. Nat. and Geogr. Science*, vol. ii. p. 63.)

* Bosc maintains that ambergris derives its scent from this cuttle, on which the whale feeds. (*Hist. Nat. des Vers*, vol. i. p. 48.)

the bivalves, are greatly so; yet, for what purpose they light up their gloomy cells, unless it be to allure some minute insect prey, it is hard to guess, for they themselves are "dark in light." Pliny says, the phosphoric fluid is so abundant in them, that it shines about the mouths of those who eat the *Dáctyli*, shines on their hands, and even on their clothes, from drops falling thereon. (*Hist. Nat.*, lib. ix. cap. 87.) The *Dáctyli* of Pliny have commonly been considered the same as the Phòlas *Dáctylus* of Linnæus; but the description given by the Roman naturalist will disturb no conjecture; and his *Dáctyli* may very possibly be the *Mýtilus* lithóphagus (Lithódomus *Cuvier*), concerning which, Mr. Charles Ulysses says, "that in the Bay of Naples the fishermen place the animal in the sun, and with it besmear their hands and faces at night, so as to illuminate them as with phosphorus." (Dillwyn's *Cat. Rec. Shells*, p. 303.)

It is, however, among the Mollúsca tunicàta that the most considerable phosphorescent species are found. The nomade [roaming] tribes of this order abound in tropical seas; and there are few of them that do not light up their lamps in the dusk. The *S*álpæ (or Dagỳsæ of *Banks*, *fig*. 109.) linked together in living chains, and the Pyrosòmæ, are the most remarkable examples. Both genera appear to emit the phosphoric flame only when the water is agitated, or when they come in contact with opposing bodies, or when they rise above the surface of the water. In his observations on



A portion of a chain of small Dagỳsæ of the natural size, and considerably magnified, to show the course of the intestine: *a*, the mouth, *b*, the anus. (From Home's *Lect. on Comp. Anat.*, vol. ii. t. 73.)

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a species of *Sálpa*, Mr. Beaufort informs us it gave no light unless the water was violently agitated. "On holding one in my hand," he adds, "and gently pressing it, a faint flame seemed to pervade the whole inside; and on each projecting point there seemed to stand a little globule of very vivid light. On increasing the pressure, its brilliancy likewise increased for a few moments, then gradually declined for some time, as if exhausted by the exertion. It may have been fancy, but, at the time, I was convinced that it gave out a sensible degree of warmth to the hand." (Home's *Lectures*, vol. i. p. 367.) The latter observation is probably not fanciful, but real; for the great Humboldt has proved that the *Sálpæ* (Bíphora of the French), as well as the Pyrosòmæ, when preserved in a bottle, make the temperature of the water rise nearly one centigrade degree. The same naturalist, so remarkable for the extent and universality of his knowledge, tells us that the Pyrosòma atlánticum diffuses, "while swimming beneath the surface of the sea, a light of a foot and a half in diameter. Only imagine the superb spectacle which we enjoyed some days ago, when, in the evening, from seven to eleven o'clock, a continuous band of those living globes of fire passed near our vessel. With the light which they diffused, we could distinguish, at a depth of 15 ft., the individuals of *Thýnnus Pélamys*, and *Sárdon*, which have followed us these several weeks, notwithstanding the great celerity with which we have sailed." (*Edin. Phil. Journ.*, vol. xii. p. 185.) Mr. Thompson has given an interesting account of the same species. It presents itself to the astonished voyager, in the calm latitudes near to the line, under the appearance of thick bars of metal of about half a foot in length, ignited to whiteness, scattered over the surface of the ocean. Some assume the luminous state, and continue so as long as they remain in view; while, in others, the luminosity declines and disappears. — "The greater number of these apparently incandescent masses pass close to the sides of the vessel, or follow in her wake; their phosphorescence being called into activity by coming in contact with her prow or bottom, as that of such as are more distant appears to be, by the conflict of the waves." The light appears to pervade the whole substance of the animal, and, "when examined near at hand, varies in intensity and in shade, often exhibiting a very beautiful phosphorescence of a bluish or greenish tinge, like a pale sapphire or aquamarine, as it gradually fades away. Agitation or friction renews it, as in other luminous animals, as long as it continues to exhibit signs of life; but it is most vivid when the animal is first drawn up, and at length can scarcely be called forth by the rudest treatment. As we observed this interesting animal, with Milbert's florid description at hand, I can aver that the red, aurora, and orange colours did not present themselves to the eyes of any of our numerous party, who were, nevertheless, highly gratified at the sight of so brilliant and singular a creature." (*Zool. Illust.*, vol. i. p. 43, 44.)

I am, &c.

G. J.

P. S. — The compiler of these letters will feel particularly indebted to any correspondent of this Magazine, who will return him an answer to the following queries: —

1. *Cypræ̀a Tìgris.* " Mr. Samuel Stutchbury, who had an opportunity of examining many individuals of C. *Tìgris* at the Pearl Islands, informed me that those cowries lived there in very shallow water, and always under rolled masses of madrepore. They never were to be seen exposed to the sun's rays. On lifting one of those masses, a tiger cowry was generally observed with its shell entirely covered by the large mantle, which was mottled with dark colours, the intensity of which the animal seemed to have the power of changing; for the colours varied in the same light and in the same medium, after the manner of the spots on the cephalopodous mollusca, or, to use a more familiar instance, somewhat in the same way that the hues of a turkey-cock's wattle vary." (Broderip in *Zool. Journ.*, vol. iv. p. 163.) The question is, Does this change in colour, in the mantle of the Cypr*æ̀a Tì*gris, depend on a structure of the skin, like that of the Cephalópoda?

2. The interior of the Fùsus antìquus is as yellow as the yolk of an egg; but the margin of the aperture, or, in other words, the newly formed part of the shell, is white. Whence is the yellow colour derived?

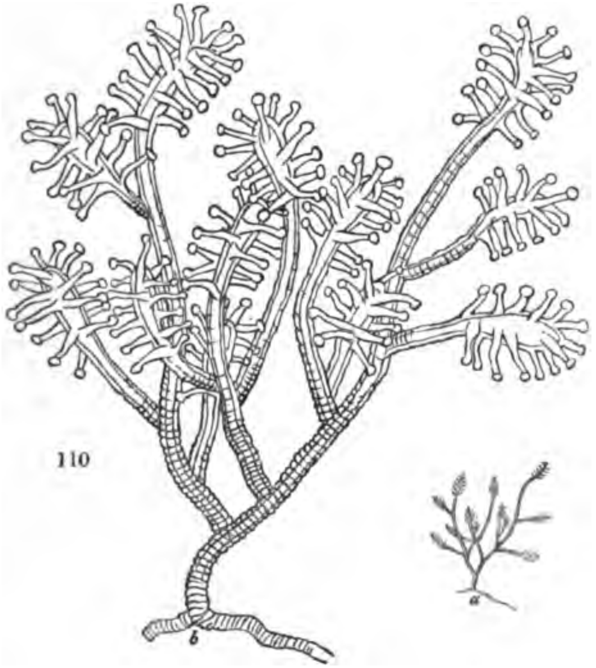
3. The apertures of Hèlix cingénda and H. virgàta are generally tinted with a beautiful pink gloss, which, says Mr. Jeffreys, is " entirely owing to the action of, and their exposure to, the sun." (*Lin. Trans.*, vol. xvi. p. 334.) But as it is only on these species that the sun's rays produce this effect, it seems necessary to admit that there must be something peculiar to the shells or animals, on which the sun operates this chemical change. What is this peculiar substance, and whence is it derived?

ART. VI. *Illustrations in British Zoology.* By GEORGE JOHNSTON, M.D., Fellow of the Royal College of Surgeons of Edinburgh.

6. CÓRYNE GLANDULÒSA. (*fig.* 110.)

Cl. Pólypi, Ord. Denudàti, Gen. Córyne.

THIS pretty zoophyte occurs abundantly in Berwick Bay, where it grows upon the sides of stones that are covered with a thin coating of fine mud, and lie in shallow pools near high-water mark. It is here invariably accompanied with another member of the same class, the Campanulària gelatinòsa of Dr. Fleming; but both of them, although interesting, and even beautiful, under the microscope, are naturally so diminutive, and so unattractive in appearance, that, like the flower of the desert, they might seem "born to blush unseen," were it not that the curious naturalist loves to search out, and to display to others, the designs in which Infinite Wisdom has moulded his animate creation.



a, Natural size. *b*, Magnified.

Córyne glandulòsa is attached to its station by slender tubular fibres, that creep along the stone, and bind the whole little colony together. The upright shoots are something less than an inch in height, and irregularly branched, each branch being terminated with a clubbed head, of a reddish colour, set round with globular-tipped tentacula, irregularly disposed. These tentacula can bend themselves at will, and they adhere tenaciously to bodies that come within their reach, probably by suction.

The stalk of C. glandulòsa is horny, and filled with a softer pith, or medullary matter, that runs in a continuous line through all the branches, enlarges itself in the heads, and even seems to run up the centre of the tentacula, where it is distinguished by its greater opacity. There is, however, no opening on the apices of the branchlets, for the sheath covers all in; and although Lamarck and others introduce a "terminal mouth" into the generic character, and, moreover, tell us, that it is very evident, and contracts and dilates itself in a remarkable manner; yet I feel assured that the species before us has no such aperture. The food appears to be imbibed through the tops of what are called the tentacula, but which, I think, are more properly reduced polypes; that is, polypes without a circle of tentacula around the oral entrance. I have come to this conclusion, because of the irregularity of their disposition; because of their structure, which is not exactly similar to that of the tentacula of other polypes; and because they cannot possibly be of the least service in conducting food to a terminal mouth.

The relations of Córyne are imperfectly known. Lamarck and Cuvier place it amongst the naked polypes, or such as have no sheath to cover the body. But Córyne has a corneous investing sheath, altogether like that of the Sertulariadæ. Dr. Fleming considers it "as one of the Tubulariadæ, having a reduced sheath, and agreeing in the tentacular origin of the ovaria;" and in this opinion I feel so disposed to acquiesce, that, in an arrangement of these productions, I would not place these genera far asunder, and certainly not in separate orders, as this last naturalist has done, in obedience to the dicta of others, and in contrariety to his own judgment.

George Johnston.

Berwick upon Tweed, May 17. 1832.

Art. VII. *Volcanoes.* By W. M. Higgins, Esq. F.G.S., and J. W. Draper, Esq.

(*Continued from* p. 272.)

The Geographical Position and History of Active Volcanoes: Europe.—The number of active volcanoes with which we are acquainted is comparatively small. We have not authenticated accounts of more than two hundred. But, in forming our estimate of the extent of volcanic action, we must keep in mind that in the interior of the Americas, and other uninvestigated districts, very many volcanic mountains may hereafter be discovered; and that it is by no means improbable that those which we now consider extinct, are in the phase of prolonged intermittence, and may again break forth with overpowering energy: and we are entirely ignorant of the number of subaqueous volcanoes; for not only may there be many in the phase of prolonged intermittence, but those in frequent activity are inadequately known.

In tracing the geographical position of the active volcanoes with which we are acquainted, we shall commence with Vesuvius, in the kingdom of Naples. The first recorded eruption of this mountain was in the year 79, when the celebrated cities of Herculaneum and Pompeii were destroyed. Dr. Daubeny is of opinion that the cone of Vesuvius did not exist till this time, and that the eruption which buried those devoted cities formed the cone of the present mountain. This probability is strengthened by the fact, that the measurement we have of the distance of the mountain from Pompeii and Stabiæ can only be reconciled with its present situation by measuring from the foot of Monte Somma. Hence, then, we may be permitted to suppose, that by the eruption of 79 Somma was destroyed, and Vesuvius is but the cone which was formed within that mountain, increased by successive eruptions; and that, previously to this time, all eruptions were from the crater of Somma. (*fig.* 111.) An account of the phenomena which attended this remarkable activity may be seen in Pliny's *Epistles*, lib. vi. ep. 20. After this it seems to have fallen into the phase of prolonged intermittence, but was again in action in the year 203. It was also violently agitated in 472, and covered all Europe with its ashes; but it was not

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until 1036 that it ejected lava, though it was in activity in the years 512, 685, and 993. From the year 1109, till the year 1306, it remained in a state of inactivity, and during the latter part of this period was covered by vegetation. In 1611 Braccini examined the crater, and it was again covered by trees; but it suffered eruption in 1631, and also in the years 1660, 1682, 1694, and 1698: from this time its periods of quiescence have been comparatively short.*

In the Bay of Baiæ we meet with another volcano, Monte Nuovo, which was formed in September, 1538. Since that time it has not shown any proof of activity, except the emission of a thin vapour from the base of its crater. But this fact, connected with the heat of the waters of the Baths of Nero, which are in the immediate neighbourhood, may be sufficient to prove that the volcanic agent is still in a state of activity. Between the Monte Nuovo and Puzzuoli there is a hill called the Solfatara, which is supposed to have been active as early as the twelfth century, and still gives off gases and aqueous vapours.

There are several other volcanoes in the district around Naples, and in the neighbouring isles of Procida and Ischia. The latter island was the seat of volcanic agency in the fourteenth century; but its eruptions appear to have generally issued from fissures. In the basin of the Mediterranean (says Humboldt) not only does the volcanic fire escape from permanent craters of isolated mountains, which have a constant communication with the interior of the earth, as Stromboli, Vesuvius, and Etna; but at Ischia, in Mount Eponice, and, according to the accounts of the ancients, in the plains of Selantis, near Chalcis, lavas have flowed from fissures which have suddenly opened at the surface of the ground. (*Tableaux de la Nature*, vol. ii.)

In the early ages of history, the volcano of Ischia was peculiarly active and violent. Strabo says that the colony sent over by Hiero were so alarmed by the frequency of the earthquakes, that they could not be induced to remain on the island. (*Strabo*, lib. v.; *Daubeny*, p. 182.) In the Lipari Isles, between Naples and Sicily, there are two active volcanoes, Stromboli and Volcano.

The Island of Stromboli consists of a large conical mountain, having on one side several small craters; one of which is in the phase of permanent eruption. This small but interesting volcano is frequently mentioned by the classical writers, particularly by Diodorus Siculus, and the learned Strabo; but as the phenomena which attend it have been already mentioned, no further notice is required.

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* For an account of the violent eruption in 1822, see Mr. Scrope's account, in the *Journal of Science*, vol. xv. p. 175; see also *Descrizione dell' Eruzione del Vesuvio avvenuta nei giorni* 25 e 26 *Decembre*, 1813, by Signor Monticelli.

The Island of Volcano, like all others of the Lipari group, is entirely volcanic; and, from the testimony of Strabo, seems to have been the seat of much more violent eruptions than Stromboli. Its crater is situated on the highest elevation in the island, and still emits gaseous exhalations in so great an abundance, that it has been described by travellers as in a state of activity. It exhibits, says Dr. Daubeny, the nearest approximation to a state of activity, during which a descent into the crater would be practicable. " Nor can I imagine a spectacle of more solemn grandeur than that presented in its interior, or conceive a spot better calculated to excite, in a superstitious age, that religious awe which caused the island to be considered sacred to Vulcan, and the various caverns below as the peculiar residences of the gods." (*fig.* 112.)

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From the Lipari Isles we pass on to Sicily, the seat of the celebrated Mount Etna. Those who have received their earliest impressions of this district from the ancients, may perhaps expect a detailed history of this volcano, as some of the most interesting of the classic tales can only be understood by reference to this mountain and the neighbouring Cyclopean Islands; but our remarks must necessarily be brief.

Etna is entirely composed of volcanic rocks, and rises in imposing grandeur to the height of 10,000 ft. above the level of the sea. It is about 180 miles in circumference, and is surrounded on every hand by apparently small volcanic cones, though of no inconsiderable size, which tend in a great degree to increase the apparent dimensions of the central mountain. Some of these cones are covered with vegetation, but others are arid and bare. From this variety in the progress of vegetation, some persons have endeavoured to calculate the relative ages of the cones; but these opinions are exceedingly vague, as it requires a longer period to form a soil on some lavas than on others [see p. 527.]. The earliest historical notice we have of this mountain is by Thucydides, who states that there were three eruptions previous to the Peloponnesian war (431 B. C.), to one of which Pindar alludes in his first Pythian Ode. In the year 396 B.C. the volcano was again active; and according to Diodorus Siculus, the Carthaginian army was stopped in its march against Syracuse by the flowing lava. But let it suffice, to say that ten eruptions previous to, and forty-eight subsequent to, the Christian era, have been recorded; some when the mountain was in the phase of moderate activity, and others when in the phase of prolonged intermittence.

From the Island of Sicily we pass on to the Grecian Archipelago, which has at various times been the seat of violent volcanic action; but we have already described the formation of Santorino and its adjacent islands. The epoch of the eruptions in Milo are unknown, but they are evidently recent; and we may therefore class it among the active volcanoes. It abounds in hot springs, and other demonstrations of a present activity.

Iceland is an island peculiarly subject to the devastating effects of volcanoes: indeed, we may mention it as more remarkable than all others, both for the number of its cones, and their habitual activity. Hecla (*fig.* 113.), the most celebrated volcano of this island, has suffered thirteen eruptions since the year 1137; and during the last eight hundred years there have been twenty-two. After the eruption of 1766, it

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came into the phase of prolonged intermittence, but was again active in 1821.

The other volcanoes of Iceland are Krabla, Eyafealla Jokul, Eyrefa Jokul, Skeptaa Jokul, Kattlagiaa, Wester Jokul, and Gullunge Syssel. All these have been the sources of violent eruptions, and have spread their lavas throughout this interesting island, which seems to be a mere vent of some vast reservoir of heated lava.

The only other situation in Europe in which we find an active volcano is the Island of Jan Mayen, off the coast of Greenland, which was active in the year 1818. When visited by Captain Scoresby, the crater was about 500 ft. deep, and 2000 ft. in diameter.

The continent of Africa does not offer a single example of an active volcano, but in the islands they are very numerous: these shall be noticed in our next communication.

(*To be continued.*)

ART. VIII. *Contributions to the Geology of Berwickshire.* By ROBERT DUNDAS THOMSON, C.M. and M.D., of the Honourable East India Company's Service. [Read before the Berwickshire Naturalists' Club, December 21. 1831.]

THE parishes of Eccles, Greenlaw, Polwarth, and Longformacus include a narrow tract of country extending from the Tweed to the Lammermoors; and, small though this tract may appear, it comprehends, as it were, a section of the county of Berwick, includes all the fundamental rocks of the county, and one or two which are peculiar to it.

The order of the rocks, beginning at the surface, is,— amygdaloid, new red sandstone, claystone porphyry, magnesian limestone, greywacke, and old red sandstone.

New Red Sandstone. — The banks of the Tweed, in the greater part of its course through the Merse, appear to consist of the rocks of this formation. The characteristic aspect which it most generally assumes is that of a dark sandstone, often highly indurated, but, when exposed, becoming soft and slaty. An analysis of it shows that it contains about 25 per cent of carbonate of lime: and from this circumstance, and its external characters, it may be distinguished as a marly sandstone. Its relative position with regard to other rocks can be well seen at Lochton, where the north bank of the Tweed is high and precipitous for about a quarter of a mile. Here it alternates with a still more indurated variety, which,

GEOLOGICAL SKETCH

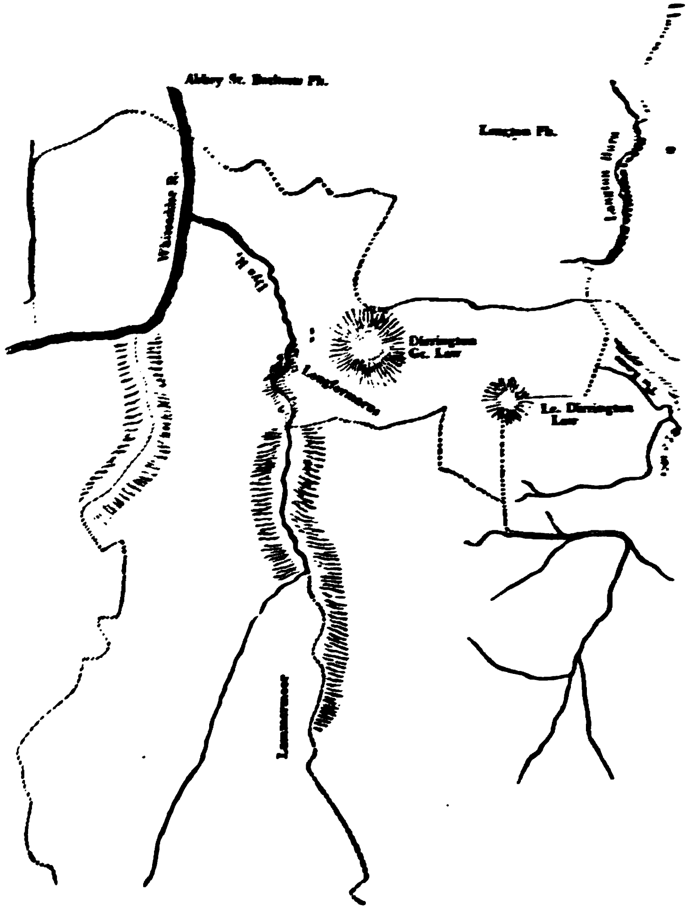
OF

THE PARISHES OF

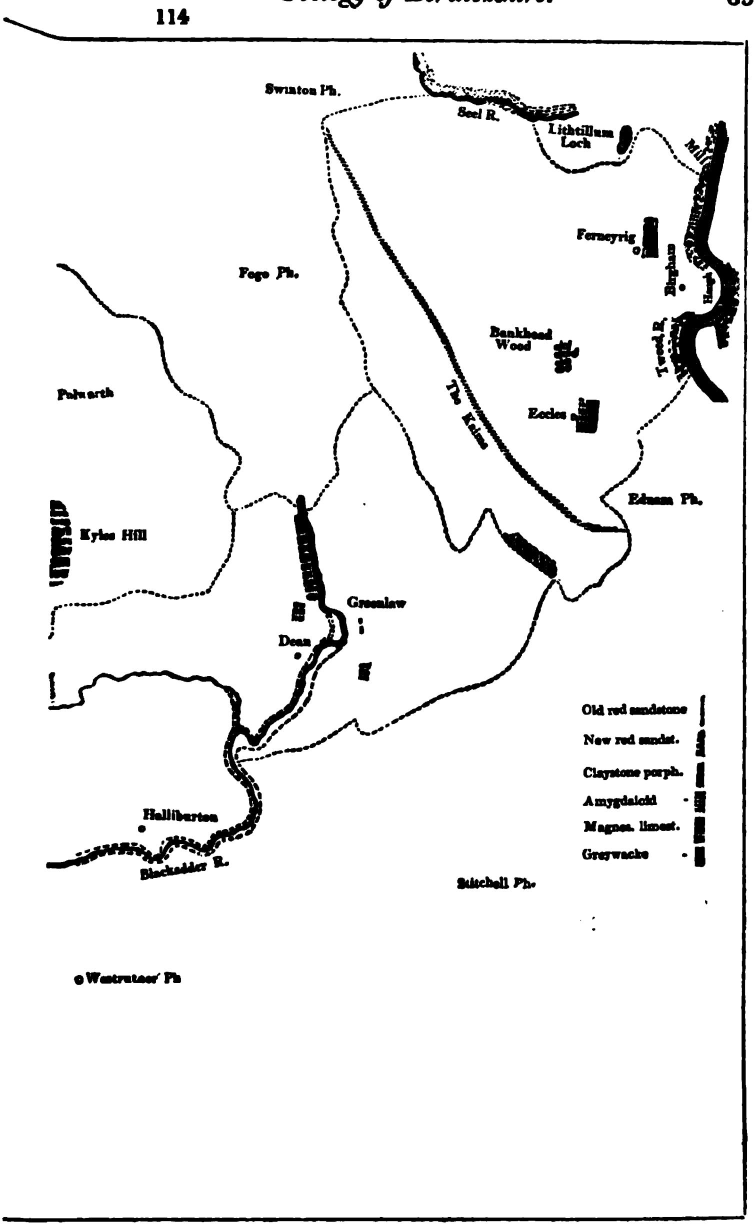
ECCLES, GREENLAW, POLWARTH,

AND

LONGFORMACUS.



from its containing a greater proportion of calcareous matter, may be denominated limestone. The soil, which is light, and at the bottom gravelly or conglomerate, lies over the sandstone



and limestone to the depth of 12 ft. The remainder of the bank, which reaches about 12 ft. more, as far as the ravages produced by the rapid current of the Tweed enable the eye to penetrate, consists of these strata; the marly sandstone being most predominant, and the limestone only occurring in thin beds. The northern half of the river is floored with the same sandstone; from which it is evident that the bank, to this extent, has been worn away and destroyed by the force of the stream and other auxiliary means. The gradual waste of the sandstone seems to be accelerated by two agents. The rock is naturally very hard; but, by the constant action of water upon it (for we find it generally moistened by numerous springs which trickle down over its whole surface), it shivers into slaty fragments; and these again are converted into a coarse powder, which is borne away by the stream.

The water which drops from these rocks has the property of what is commonly termed *petrifying*, which is produced by a solution of bicarbonate of lime, and shows that it has been subjected to pressure.

But a still more powerful agent is the frost of winter. The rock, when gently heated in the fire, is found to lose much of its weight: this loss of weight is accompanied with decrepitation; which shows that the moisture is not chemically combined, but mechanically deposited between its plates. During winter, the water freezes, expands, and splits the rocks, which crumble and decay.

About a foot above the level of the river there are two beds of red massy gypsum containing crystals, and a thin bed of white fibrous gypsum. The former is hydrous sulphate of lime, containing one half per cent peroxide of iron.

The highest part of the bank, which is called Hindlaw Top, exhibits, perhaps, the most characteristic section of the strata, although the sulphate of lime beds are thicker higher up. Hindlaw Top is about 50 ft. in perpendicular height, by measurement.

This marly sandstone occurs in connection with a white variety, which contains less carbonate of lime, and is more compact in its structure: it occurs at Lochton, and on the east of Birgham Haugh, having a slight dip to the south-west. The same rocks can be distinctly traced along the Tweed to Coldstream, and up the banks of the Leet to Swinton; and, near Belchester, contain thin beds of gypsum.

The sandstone at Eccles belongs to the same formation; and here it becomes an excellent building-stone, highly excelling in durability, and seems to have been quarried for at least 700 years. The ancient convent of Eccles was founded a second time in 1154, according to Hoveden and the Melrose Chronicle; and it appears to have been built of this stone. The ruins of this nunnery still exist; and, if we may judge from the uninjured state of the walls which now stand, we have every reason to think that the building might have remained to this day, a lasting memorial of times long gone by, if the barbarous conduct of an English warrior had not consigned it to destruction. It was destroyed, along with many other convents in Merse and Teviotdale, by the Earl of Hertford, in 1545.

The interesting monument at Crosshall, distant about a mile from Eccles, which consists of an entire column of sandstone covered with sculptures, above 15 ft. high, and appears to be scarcely less ancient than the convent, has been also derived, in all probability, from the quarry of Eccles.

In the north of the parish of Eccles, this sandstone contains an unusual quantity of silica, and is so hard as to be almost a quartz rock. The whole of the parishes of Eccles and Swinton, and the southern parts of Greenlaw and Polwarth, belong to this formation.

The marly sandstone, from its dark colour and slaty structure, is liable to be mistaken, and has been considered by some as belonging to the coal measures. The characters which distinguish it as a member of the new red sandstone formation are sufficiently strong and irresistible, and show that its deposition must have been subsequent to that of the coal series: for, first, it contains beds of sulphate of lime, a mineral which characterises this formation; and, secondly, it lies over the magnesian limestone, a rock which we are immediately to consider, and which is exposed in two different parts of the parish of Eccles.

On the east side of Birgham Haugh, the north bank of the Tweed, which hitherto we have described as consisting of sandstone, is composed of amygdaloid. This rock assumes two aspects: that portion of it which constitutes the round irregular masses and rocky islets in the middle of the river, and which are the means of forming several fine angling streams, has a wacke basis approaching to clay. Through it are interspersed crystals of calcareous spar, and its cavities contain green steatite and stilbite. The rock which more properly constitutes the bank of the river is nearly allied to greenstone; but the almond-shaped cavities are still present, and they contain small round masses of quartz. This mineral continues exposed for 100 yards, when the sandstone again appears.

Magnesian Limestone.—This rock makes its appearance at the west side of Birgham Haugh, and constitutes the bed of the river. Its external aspect is lighter-coloured and more compact than the English dolomite; it is very difficult to fracture; it is slowly soluble in acids, so that, for its speedy solution, it is necessary to pulverise it and apply heat. Specific gravity, 2·723; colour grey; lustre dull, occasionally pearly from the calcareous spar embedded in it; opaque; hardness, 3·5. Before the blowpipe, *per se*, becomes yellowish; on charcoal, is rendered caustic; fuses, with phosphate of soda and borax, into a transparent bead; and, with carbonate of soda, into an opaque one. Its constituents are: —

Carbonate of lime	49.6	
Carbonate of magnesia	44·	
Silica	4·	
Peroxide of iron	1·2	
Alumina	1·	
		99·8

If we abstract the impurities, this corresponds very nearly with

Carbonate of lime	6.25	
Carbonate of magnesia	5·25	
		11·5

Hadden Rigg, which constitutes a rising ground on the south side of the river, and runs parallel with it, consists of this mineral and claystone porphyry. It may be observed two miles higher up the Tweed; and the sandstone quarry of Sprouston seems to repose on it. There is an excellent section of the mineral and its alternating strata along the bank of Carham Burn, a small streamlet which separates the two kingdoms, and which makes a conspicuous figure in the border history under the name of Reddenburn. It rushes with considerable impetuosity down a declivity, in order to discharge its waters into the Tweed, tearing up the soil and rocks, and has exposed the strata for the inspection of the geologist. Immediately under the soil lies a stratum of claystone porphyry of a purplish colour, in which the clay is most predominant, containing some nodules of quartz, &c. Then comes a stratum of magnesian limestone; with red hornstone, a mineral which is very abundant here, often of a fine flesh red colour, but sometimes almost as pale as quartz: and thus a succession of alternations proceed, till we arrive at the bed of the rivulet. *Fig.* 115. is a section and measurement of these strata.

The porphyry is sometimes very finely granular, having rather a beautiful appearance, and is so hard as to be used for mending the roads. It seems to occupy the place of the breccia, which occurs in connection with the magnesian limestone on the coast of Durham; and a similar rock is said to exist along with the dolomite of the coal country of Upper Silesia.

The same limestone lies under sandstone at Eccles, but is there darker-coloured. At Hadden Rigg it has been burned, and employed as manure; but the distance of coal is a great drawback to its use.

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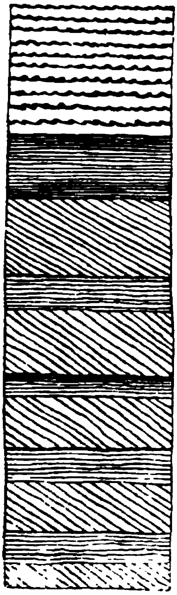

	ft.	in.
Soil - - - - -	6	0
Magnesian limestone with hornstone - -	0	6
Claystone porphyry - - -	4	0
Magnesian limestone and hornstone - -	0	2
Claystone porphyry - - -	2	6
Magnesian limestone and hornstone - -	0	1
Claystone porphyry - - -	2	0
Magnesian limestone and hornstone - -	0	3
Claystone porphyry - - -	1	0
Magnesian limestone and hornstone -	0	3
Claystone porphyry.		

Old Red Sandstone.—In travelling northwards from the Tweed, we first meet with this rock at Greenlaw; all the intermediate country, as we have said, being situated in the new red sandstone formation. The banks of the river Blackadder, above Greenlaw, consist entirely of this rock. To every one who inspects these banks, it must appear desirable that more should be done to improve their appearance; for we have rarely seen a better situation for art to assist nature, by planting trees in the ravine, and on the high and precipitous rocks, where they would tower aloft, and present an admirable prospect. The rock is soft, and affords a good material for building, although its nearly brick-red aspect does not please the eye so well as the more delicate colour of the new red sandstone. The fracture presents small interspersed portions of white sandstone. The strata dip slightly in the direction of the river. We have traced the rock for several miles above Greenlaw, and the moor is strewed with small masses of it. It may be observed *in situ* on the east side of Great Dirrington Law, and at the bridge over the Dye, at Longformacus, where it becomes coarser, granular, and runs gradually into greywacke, which occurs a few yards above it with all the characters of a sandstone, but of a grey colour. A coarse conglomerate, consisting of round masses of white and red sandstone, appears at the church, and the red rock forms the bed of the river for some hundred yards upwards. When rubbed between the fingers, specimens of this rock often leave a red impression, which is readily communicated to water. The stream of the Dye, as well as that of the Blackadder*, has a dark colour, which is characterised by their names, and produced by their

——————" tide
That chafes against the scaur's red side."

The red sandstone, as it occurs at Longformacus, is composed of grains of quartz, felspar, and mica, and perhaps Lydian stone, cemented together by a basis of red clay, and seems to be disposed in vertical strata. After tracing out this rock carefully, we cannot fail to be struck with the aspect of the soil which overlies it. It constitutes valleys and low grounds; and the country which belongs to this formation is characterised by a very bleak and barren appearance. The whole of the wild moor between the Merse and the Lammermoors, seven miles in breadth, belongs to this formation. In some spots agriculture has been commenced, and, where it has been begun with vigour, great improvements have been made. The shelter of wood, however, is a great deficiency, which it is to be hoped may be supplied, and be the means of rescuing, from its present waste and desolate situation, a tract of country which possesses many of the natural requisites of a highly improvable district. The Merse, which is now surpassed for richness and beauty by no part of the kingdom, must at no very distant period have been equally in a state of nature.

Greywacke. — The red sandstone passes gradually into this rock, and appears to lie under it; but perhaps this appearance may be occasioned by the vertical position of the strata of the two rocks, where they run into each other. It is certain, however, that the sandstone and the greywacke are similarly constituted; with this difference, that the basis of the former is red, and that of the latter grey. The greywacke, then, may be considered as a sandstone in this locality.

The whole of the Lammermoors appear, as far as they have been examined, to consist essentially of this rock, alternating occasionally with greywacke slate. The rocks of which the two Dirringtons consist are so effectually concealed by deep soil, that it is impossible to form any accurate idea of their constitution. At their bases, however, we find the red sandstone, which, as has already been stated, may be considered as forming the low grounds, and the greywacke as reposing upon it, or as forming processes or protuberances, and constituting the hills and high lands. The greywacke, at Longformacus, is characterised by its resemblance to sandstone; but, in other places, it approaches nearer to the true species of that rock as it is described in geological treatises, consisting of a basis of clay slate, with portions of the same rock interspersed. But the aspects which greywacke assumes are very various, and in number are equalled by no other rock, perhaps, which has yet been discovered.

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* Blackadder, or Black water. Whiteadder, or White water.

In the middle of the parish of Polwarth, a considerable elevation rises, called Kyles Hill, covered principally with oaks, upon which grows in profusion the lichen Alectòria jubàta, in long and pendent tufts resembling the hair of some animal. The hill is constituted of a highly indurated species of porphyry, having a red clay basis, containing felspar interspersed through it. This rock assumes the same place which the greywacke holds in the Lammermoors, as already described, the red sandstone being quite conspicuous towards the base of the hill, and exposed in the bed of the small streams which run down its sides. It affords a good material for mending the roads, and is accordingly employed for that purpose. The red sandstone, as it occurs here, is much coarser than usual, and is in some places a rough conglomerate, but is always easily decomposed after some exposure to the influence of the atmosphere.

The minerals which have now been described constitute the whole of the rock formations which we have met with in the district to which we have confined ourselves: but there are some alluvial deposits which are very remarkable, and which must have attracted the attention of the most ignorant in geology. I allude to the gravelly ridges, or *kaims*, as they are locally denominated, of which there are two examples in the parishes of Greenlaw and Eccles. The former is infinitely the more striking; for, as the surrounding surface is level, and in a state of nature, there are no intervening objects to obstruct the prospect, and it is visible at a very considerable distance.

The ridge extends from W. to N. E., exhibiting an irregular and broken outline for above a mile, and in some places is said to be 20 ft. high. The contents are a fine gravel, or sand, consisting of fragments of greywacke.

In the parish of Eccles, a considerable elevation appears at Hassington Mains, and can be traced by Loanknow and Ploughland, and probably gives name to Kames, once the seat of the late Lord Kames. At Hassington Mains, where is its western termination, the contents are composed of large water-worn masses of greywacke; but towards the east they consist of fine gravel or sand. Similar ridges, upon a smaller scale, may be observed in various parts of the county; especially upon Dod Water, where they constitute hillocks, and assume a very artificial aspect. In cutting small eminences on public roads, a section is often made of what the workmen call a sandbank, which is a small ridge analogous to those described, and derived, in all probability, from a similar origin.

The Merse derives its name from its former marshy and boggy condition; which shows, independently of the remains which we now meet with, that it was subjected to the inundations of water. We might suppose that the whole district was one immense loch, or inland sea*; and the ridges which are now so conspicuous, were produced by the alternate subsidence and swelling of the waters, as we observe in shallow seas. But the facts, that the contents of these ridges are greywacke, and that the stones scattered over the fields for many miles northwards from the Tweed, consist of the same materials, prove most powerfully, or at least afford a very strong presumption, that an aqueous current setting in from the Lammermoors was the agent which produced these appearances. From whence this current was derived, and if it afforded a supply for the loss occasioned by evaporation, are different questions, upon which it is not necessary for us to enter. It is obvious, however, that, when the supply of the current diminished, occasional violent torrents would wash down the smaller particles which had been disrupted and loosened by the action of the water; and when the velocity of the stream ceased, the matter borne along with it would be deposited in the form of a ridge. The figure of the Greenlaw Kaims, which presents a hollow towards the hills, favours this idea; and that the breadth of the current had not been great is likewise probable, from the nature of the angle which appears to have been produced by the centre of the mass of water.

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* The quantity of common salt which exists in solution in the wells and rivers of the Merse, would go to prove that this district had at no very distant period been subjected to inundations from the sea. The imperial gallon of the well water at Eccles Manse contains: —

Specific gravity, 1.000792

Sulphate of lime - -	57.75	
Common salt - -	29.752	
		87.502

REVIEWS.

Art. I. *Catalogue of Works on Natural History, lately published, with some Notice of those considered the most interesting to British Naturalists.*

Pritchard, Andrew: The Microscopic Cabinet of Select Animated Objects; with a Description of the Jewel and Doublet Microscope, Test Objects, &c.: to which are subjoined, Memoirs on the Verification of Microscopic Phenomena, and an exact Method of appreciating the Quality of Microscopes and Engiscopes; by C. Goring, M.D. The whole work illustrated, from original drawings, by thirteen coloured plates, and numerous engravings on wood. 8vo, pp. 246. London, 1832. 18*s.*

This work may be termed a practical treatise on the present state of microscopes; and supplies, collaterally with this its primary object, 82 pages of description, and ten coloured plates of figures of the aquatic larvæ of insects, crustacea, and animalcules. Some of the subjects in the coloured engravings and woodcuts, it is said, have not been previously published in Britain; and, in the descriptive portion, valuable information is imparted on the structure and habits of these most interesting creatures; and for procuring, feeding, preserving, and the best mode of examining them, useful directions are given. We are warmly desirous of the accumulation of a voluminous body of information, written in as popular, yet able and technically definite, a manner, on all the objects of nature which defy, by their minuteness, elucidation by the application of unassisted vision. All the discoveries hitherto made should be collected, and re-tested, and additional researches unremittingly prosecuted; and, for effecting an object so useful, and importantly serviceable in promoting our knowledge of nature, perhaps no means will be found so conducive as a Magazine on the Microscope, which should admit contributions from all microscopists, and their mutual animadversions on each other's researches. Thus would the public be informed of numerous interesting discoveries, which probably now totally escape registry; and these, from being liable to the close scrutiny and canvass of numerous students and contributors, all emulous of excelling each other, would become facts established by the concurrent testimony of competent judges, and subsequently available to the views of the generalising compiler and systematist. It surely can scarcely be doubted that the public is now enough imbued with a regard for natural science, to patronise a work of this scope sufficiently to cause it to remunerate those who may embark in it. During the latter portion of the life of Mr. Carpenter, Gill's *Technological Repository* was frequently enriched with the very interesting results of his microscopical investigations; but a work appropriated solely to the reception and diffusion of this kind of knowledge would, we apprehend, be received by the scientific public with increased welcome.

To return to the *Microscopic Cabinet*. As above implied, the remaining pages and plates discuss the more strictly optical considerations which appertain to microscopes and engiscopes; this latter term being used to express those instruments "which exhibit an image of the object, whether they be reflectors or refractors." Of this part of the work, we declare ourselves incompetent to judge, but may say, it seems abounding in highly scientific and practical knowledge, which will probably considerably, perhaps vastly, avail the users and studiers of microscopes. After remarks on the requisite qualities of perfect instruments, and on the author's mode and materials of structure to produce these qualities, two plates and several pages of remarks are supplied on "test objects;" among which we are again treated, although incidentally, with information on insects. Insects, however, are not the only "tests" introduced; for, as "new test objects," there are presented "engravings of the appearances presented by magnified artificial stars (globules of quicksilver on a black ground), and white rings or annulets painted on a black enamel plate, or dial, when viewed within and without the focus of microscopes and engiscopes of different qualities." The vegetable kingdom seems to have been so slighted, that scarcely any "test objects" have been chosen from it; but it may be that they are inapplicable as "test objects," although objects of very high interest for ordinary microscopical inspection.

Vigors, N. A., F.R.S., Editor: The Zoological Journal, No. 19. Price 10*s.*; or, with the Plates uncoloured, 7*s.* 6*d.* Part IV. of Supplementary Plates, price 18*s.*; or, with all the Plates uncoloured, 10*s.*: the Coloured Copies to Members of the Royal, Linnæan, Geological, and Zoological Societies, 15*s.*

Both the above were published in July last. The number, on its cover, is stated to occupy the interval from July, 1830, to September, 1831. It contains some valuable contributions to natural science. There is a majority of papers on Mollúsca. They are these: a paper, by the Rev. T. Lowe, on the genera Melámpus, Pédipes, and Truncatélla; with Experiments tending to demonstrate the real Nature of the respiratory Organs in the Mollúsca. This paper is illustrated by figures, and occupies twenty-four pages. One by the Rev. M. J. Berkeley, on the internal Structure and Affinities of the Helicolìmax (Vítrina) Lamárck*ii*, and of the animal there are five figures in the supplementary plates. This paper, of nine pages, is properly a supplement to that by Mr. Lowe on this subject, in vol. iv. p. 343. of the Journal. W. G. Broderip, Esq. F.R.S., has a paper descriptive of a new cowry, and other Testàcea, brought to England by the Rev. Archdeacon Scott. M. Verany contributes a paper, in the French language, on the Carinària mediterrànea, of which there are two figures in the supplementary plates: this seems a most interesting animal. An article, entitled, "Description of the Cirrhípeda, Conchífera, and Mollúsca, in a Collection formed by the Officers of His Majesty's ships Adventure and Beagle, employed between the years 1826 and 1830 in surveying the Southern Coasts of South America, including the Strait of Magelhaens and the Coast of Tierra del Fuego;" by Captain King, assisted by Mr. Broderip. A new species of herring has been discovered among the finny visiters of our coasts, by Mr. Yarrell, who describes it, and names it *C*lùpea Leách*ii*; of this there is a figure. In entomology, A. H. Haliday, Esq., supplies an article termed "the Characters of two new Dipterous Genera, with Indications of some Generic Sub-divisions and several undescribed Species of Dolichópidæ:" there are some figures illustrative of this article. Our valued contributor, Mr. Westwood, communicates some supplementary notices to some of his previous papers. There are some articles additional to these, named "Analytical Notices of Books;" and "Scientific Notices." Among the latter, Mr. Thomson presents some corroborative remarks on the Metamorphoses of the decapodous Crustàcea. The supplementary plates exhibit Paradoxùrus leùcopus (white-footed), *M*ustèla flavígula (yellow-throated), *Á*nas Rafflès*ii*; Osphrómenus ólfax, or goramy; Helicolìmax Lamárck*ii*, Carinària mediterrànea, Myochàma anomiöìdes, Cleidothæ'rus *c*hamöìdes, twelve species of Chìton; coleopterous insects, Rhysòdes exaràtus, Catógenus rùfus, Cucùjus píceus? Cucùjus unifasciàtus? with numerous figures, exhibitive of the anatomical details of these insects.

Lindley, John, F.R.S. &c. Professor in the University of London; and *Hutton, William,* F.G.S. &c. The Fossil Flora of Great Britain; or Figures and Descriptions of the Vegetable Remains found in a Fossil State in this Country. Part I. of Vol. I. 8vo. London, 1831–2. 1*l.* 2*s.*

This work is an important contribution to the science of British, and, indeed, of universal, geology; and, we trust, will be so patronised by the scientific men of our country, as to cause it to be proceeded in with spirit and satisfaction by its authors and proprietors. A very high degree of botanical ability is evinced throughout the book; indeed, so much as to require, on the part of the reader, a mind already well furnished with botanical ideas. The preface is a rich and valuable essay on Fossil Botany. This " Part I. of Vol. I." contains 39 plates, and about 150 pages of letter-press. The work appears in quarterly numbers, eight of which are to form a volume. The authors " hope, that a work appearing periodically may become the focus of all the knowledge that will be gradually acquired in regard to this important subject: that it will keep the enquiry in sight of those who, from their local position, will be able most powerfully to aid it by the examination of [fossil vegetable] remains within their reach; but who may be the least acquainted with the nature of the information that is wanted, and with the progress that the science is making elsewhere." In a subsequent part of the preface, instructions are supplied as to the way in which " the state of the fossil remains of plants renders it almost indispensable that any investigation of their original structure should be conducted;" and as to " what the chief points are, to which the attention of collectors should more especially be directed."

Riley, W. E.: Remarks on the Importation and Result of the Introduction of the Cachemire and Angora Goats into France, and the extraordinary Properties of the new Race, Cachemire-Angora; with its Capability of also rendering the Common Goat of Value to the Colonists of New South Wales and Van Diemen's Land. 8vo pamphlet, of 48 pages. London, 1832.

This pamphlet will be found noticed in the *Gardener's Magazine* for Aug. 1., vol. viii. p. 452.

COLLECTANEA.

Art. I. *Zoology.*

Facts and Observations in Natural History, by William Sells, M.R.C.S. Kingston, Surrey, January 1. 1832.—[The circumstances under which the following paragraphs were written are explained p. 470.; the present being the remainder of all that were communicated. —*J. D.*]

On the Process of Lactation in Animals. (*White's* Selborne, p. 215.) — It has been most wisely ordered that the process of suckling the young should be as pleasurable to the parent animal, as it is essential to the support of the infant progeny; the mammæ (dugs) of animals become painful when over distended with milk; and the drawing off of that fluid not only removes positive uneasiness, but affords positive pleasure. The nipple, previously soft and flaccid, upon the young animal beginning to suck, becomes enlarged, firm, and erect, and the flowing of the milk is accompanied by an exquisitely pleasing sensation to the mother: the nipple is highly organised, and becomes erect on application of slight friction, and, by a kind of spasmodic action, will sometimes throw out the milk in jets. I once saw, at Exeter 'Change, a young panther suckled by a bitch; and, last year, a tom cat of mine, which had been castrated in order to make him a better mouser, and to keep him at home, was often to be seen sucking a spaniel bitch.

Boars scarcely emasculated by the Loss of their Tusks. The following note was annexed to a passage in White's *Selborne*, (p. 212.), where he alluded to the fact reported by Mr. Lisle, of a boar losing his sexual powers in consequence of being deprived of his tusks. This is doubtless erroneous, as I have known the tusks of many dangerous boars sawed off, to prevent accidents, without any such consequence; but I have seen them appear much cowed by the loss of their tusks, as they were no longer able to command their previous monopoly of the sows, the young boars ceasing to be afraid of them.

Retention of Vitality in Frozen Fish and the Leech. (*White's* Selborne, p. 294.) We have the best evidence to prove that fish and some molluscous animals may be frozen without destroying their vitality. A friend of mine, at Camberwell, had an inflamed eye during the winter of 1829, and had a leech which was applied to the temple several times; it was kept in water, in a vial, and placed on the carpet near the fireplace of the parlour; the cold at that time was very severe, and every night the leech was frozen, and thawed the following day. Mr. Knight was there at the time, witnessed the fact, and expressed, I am told, no small interest at this curious incident. It was observed by Captain Franklin, during the severe winter they experienced near the Coppermine River, that the fish froze as they were taken out of the nets; in a short time they became a solid mass of ice, and by a blow or two of the hatchet were easily split open; if in the completely frozen state they were thawed before the fire, they recovered their animation. This is a very remarkable instance how completely animation can be suspended in cold-blooded animals.

Silkworm. It has occurred to me, and I have not seen it remarked elsewhere, as a striking and interesting peculiarity of this insect, that it does not wander about as all other caterpillars do, but that it is nearly stationary in the open box or tray where it is placed and fed: after consuming the immediate supply of mulberry leaves, it waits patiently for more being provided. I apprehend this cannot be said of any other insect whatever. This docile quality of the worm harmonises beautifully with its vast importance to mankind, in furnishing a material which affords our most elegant and beautiful, if not most useful, of garments. The same remark applies to the insect in the fly or moth state, the female being quite incapable of flight, and the male, although of a much lighter make, and more active, can fly but very imperfectly; the latter circumstance ensures to us the eggs for the following season, and thus completes the adaptation of the insect, in its different stages, to the useful purpose it is destined to fulfil for our advantage.

A curious Fact concerning Bees. As a small vessel was proceeding up Channel from the coast of Cornwall, and running near the land, some of the sailors observed a swarm of bees on an island: they steered for it, landed, and took the bees on board; succeeded in hiving them immediately, and proceeded on their voyage: as they sailed along shore, the bees constantly flew from the vessel to the land, to collect honey, and returned again to their moving hive; and this was continued all the way up the Channel. (*Times*, 1830.)

Turtles. White mentions that it is reported of the land tortoise, that it is occupied one month in completing one *fête d'amour;* and this remark leads me to mention that I was more than once informed, in Jamaica, that the male and female turtle remain coupled during the period of nine days. The turtler, mentioned in p. 476., whom I asked on this matter, assured me, that I had been correctly informed.

Lizards. I have frequently seen these animals procreate; they lie on their sides, belly to belly, and remain united for a considerable time. — *W. Sells.*

Fringílla Montifringílla (the Brambling) and Fringílla Chlòris (the Greenfinch) both possess imitative Powers of Song; and an Instance of the Brambling's being met with in Norfolk. — Sir, Mr. Acton (Vol. IV. p. 163.) speaks of *F*ringílla Montifringílla as a rare bird. Perhaps it may be interesting to that gentleman, and to your other readers, to know that an individual of this species was caught, in the winter of 1825, at Downham, Norfolk; which I kept for nearly a year, and which is now preserved in my brother's collection. Its natural note was harsh and monotonous; but I found that it had strong imitative powers, and easily caught any notes which I whistled to it. It is not a scarce bird in Norfolk, but a regular winter visitant. I had also an opportunity, in two successive years (1827 and 1828), of witnessing a similar power in the *F*ringílla *C*hlòris, a congener of the former bird. A pair of them resorted to some trees close to my house, and, during the period of incubation, the male delighted me with its powerful but imitative song: an instance of an acquired song, whilst the bird was in its wild state, which I never heard of before. I am, Sir, yours, &c. — *Henry Creed. Chedburgh Rectory, near Bury St. Edmunds, Feb.* 9. 1832.

Mocking Powers of the Sedge Bird (*Currùca salicària* Fleming.) — In the article "Sedge bird," in Montagu's *Dictionary*, p. 455. of Rennie's edition, the writer says, "It has a variety of notes, which partake of that of the skylark and the swallow, as well as the chatter of the house sparrow. According to my observations, it has a much greater variety than this: I have heard it imitate, in succession (intermixed with its own note of *chur chur*), the swallow, the house martin, the greenfinch, the chaffinch, the lesser redpole, the house sparrow, the redstart, the willow wren, the whin chat, the pied wagtail, and the spring wagtail; yet its imitations are confined to the notes of alarm (the pelting notes, as they are called here) of these birds, and so exactly does it imitate them, both in tone and modulation, that if it were to confine itself to one (no matter which), and not interlard the wailings of the little redpole and the shrieks of the martin, with the curses of the house sparrow, the *twink twink* of the chaffinch, and its own *care for nought* chatter, the most practised ear would not detect the difference. After being silent for a while, it often begins with the *chur chur* of the sparrow, so exactly imitated in every respect, that, were it not for what follows, no one would suppose it to be any other bird. It is called the mocking-bird here, and it well deserves the name; for it is a real scoffer at the sorrows of other birds, which it laughs to scorn, and turns into ridicule by parodying them so exactly. I never heard it attempt to imitate any of the larks or thrushes, although I have listened to it for hours. This bird was very plentifully met with in Wharfdale, ten years ago, and is also found in this neighbourhood; but I am not aware that any body in either of those districts ever attempted to keep one in confinement; although, from their powers of imitation, I think the experiment well worth trying: probably the idea that they could not provide them with proper food has prevented them. — *T. G. Clitheroe, Lancashire, May* 2. 1832.

Sedge Warbler (*Currùca salicària* Fleming). — Sir, A very observant person in this neighbourhood, who is much out at night by the river side, assures me, that he has observed this bird during the whole winter, about the spot whence it was heard pouring forth its varied notes every night during the summer, from the middle of May to the latter end of July. It is described by all naturalists as a migratory bird, as well as its congener, the reed warbler (*C.* arundinàcea): but may not an individual occasionally winter with us, as is the case with some of the migratory species? I am anxious for a confirmation of this point. — *J. S. K. High Wycombe, July,* 1832.

The Sedge Bird (*Currùca salicària* Fleming), at Godalming in Surrey, may commonly be heard repeating its harsh and unpleasant notes through the night in summer. — *Edward Newman. Deptford, Sept.* 19. 1831.

The Nightingale singing on the 12*th of December.* — At Godalming in Surrey, on the 12th of December, either 1823 or 1824, I heard the nightingale singing clearly and distinctly, although not very loudly. I luckily had a companion at the time, a close observer of birds, who has several times since borne testimony to this remarkable fact. In the same neighbourhood, I have frequently seen the nightingale in the month of October, and once in November. — *Edward Newman. Deptford, Sept.* 19. 1831.

Habits of the Strix Scóps L. *in Italy.* — This owl, which in summer is very common in Italy, is remarkable for the constancy and regularity with which it utters its peculiar note or cry. It does not merely "to the moon complain" occasionally, but keeps repeating its plaintive and monotonous cry of *kew kew* (whence its common Florentine name of *chiù*, pronounced almost exactly like the English letter Q), in the regular intervals of about two seconds, the livelong night; and until one is used to it, nothing can well be more wearisome. Towards the end of April, last year, one of these owls established itself in the large *Jardin Anglais*, behind the house where we resided at Florence; and, until our departure for Switzerland in the beginning of June, I recollect but one or two instances in which it was not constantly to be heard, as if in spite to the nightingales which abounded there, from nightfall to midnight (and probably much later), whenever I chanced to be in the back part of the house, or took our friends to listen to it, and always with precisely the same unwearied cry, and the intervals between each as regular as the ticking of a pendulum. This species of owl, according to Professor Savi's excellent *Ornitologia Toscana* (vol. i. p. 74.), is the only Italian species which migrates; passing the winter in Africa and Southern Asia, and the summer in the south of Europe. It feeds wholly upon beetles, grasshoppers, and other insects. — *W. Spence. Pisa, March* 4. 1831.

Habits of the Blue Titmouse or Tomtit (*Pàrus cærùleus* L.). — Sir, *Sc*ólopax rustícola acquaints us (p. 289.) with the fact of the blue titmouse's having, for two successive years, built its nest, and reared its young, within the jaws of a gibbeted human skeleton. Some years since, I knew a place which, for many years, had been almost annually chosen as the habitation of a pair of tomtits (Pàrus cærùleus *L.*): whether the same couple had occupied it all the time, the reader must guess. It was a hole in a wall that communicated with a dark chamber; and into it I could peep, without being observed by the little architects. These favourable circumstances not being of every day, nor every year, nor every village, nor every county, occurrence, I resolved to watch the birds, if the place should again be chosen as a habitation. As a first step, I placed a small square box in the hole, with a view not only to accommodate myself, but the birds also; for the hole came through the wall; and against it, but not quite close, was placed a shutter; and, before I gave them the box, many and many a bit of moss did Tom and Peg bring for their nest, which fell down, one after another, between the shutter and the wall. Indeed, I have seen more than a hatcrownful of moss disposed of in this way, before the bird had been able to commence the formation of the nest. Well, a pair of birds soon took possession of the box, and great delight that my scheme was likely to answer took possession of me; and many, and short between, were the visits that I paid to my protégés. Very soon the nest was almost finished; and I watched impatiently for the first egg. Day after day I inspected the box, but no egg did I find. I began to think either a lad or a mouse must be the manufacturer, for there was very little appearance of "architecture:" the brown moss seemed to be just laid in the box. I therefore examined the nest, and, carefully hidden, with apparent carelessness, I found three beautiful eggs. The nest was thus covered after the deposit of each egg (I believe one was laid every morning), till the number was completed, when they began to sit; and, of course, the eggs were not afterwards covered. Fourteen days (I believe fourteen) brought to light a fine family of little ones. We three were all very happy with our fine prospect, but in a few days one of the old ones, I suppose the mother, was killed with a stone. The young ones soon died. Indeed, I am not aware that the other bird ever visited the nest after he lost his mate. Thus ended the first trial; and a sore trial it was to a lad, to lose so promising a family.

The following year, another nest was built, eggs were laid, and the bird began to sit. In order to discover whether birds "sit so hard," as is represented, I repeatedly disturbed the hen whilst on the nest; and several times, with a small stick, actually turned her "topsy-turvy," but never frightened her from the nest. In due time I had a brood of tomtits. When first hatched, the hen sat upon the young ones several hours during the day. This time was gradually shortened, till they were sufficiently fledged not to need such a means of warmth. Nothing but small grubs and caterpillars were brought to the nest, and I was induced to believe that the depredations of these birds are not, at that time of the year, injurious to vegetation. Many insects did they bring, from some apple trees that grew near, but no buds.

Now, as to the method by which the nest was kept clean and wholesome. Some time after the young ones were hatched, I noticed that the old bird, having fed the young one, did not immediately fly away, but waited a few seconds; and if the young one which had just received the food had any *alvomotive* inclination, it instantly changed its position, by locating the tail where its head had previously been, the excrement was voided, and was immediately taken up in the beak of the old bird. I observed this so frequently, that I am satisfied the old bird always stayed a few seconds; and if the young ones retained their position, which was often the case, the old one flew away; but if the young one had a call, it instantly tumbled itself, "head over heels," and while tail was uppermost, the old one seized the voided material, and flew away with it, and the young urchin immediately resumed its natural position. All this was transacted in a much shorter space of time than is occupied in reading the account. In general the reception of food into the stomach seemed to act as a stimulus to the propulsion of the intestinal contents, though the contrary was frequently the case. The young birds flourished, and, when nearly fledged, the nest was discovered by some lads, who took them from their " clean, warm, soft nest, and from the parent birds," and one by one deliberately pelted them to death. Such was the result of my second trial to rear a brood of tomtits.

My next step was to hang up a small circular box, with a hole just large enough to admit a small bird, against the wall of an outbuilding, in hopes some friendly tomtit would adopt it as a habitation. The first summer, tom did not come, at least did not build; the second summer I was one day walking past, and heard a noise, as if some bird was confined in the box, and beating the side with its wings. I found it was tommy building his nest; and the noise, which I often heard afterwards, was made by the bird, as I suppose, adjusting the moss. The nest was completed, the eggs were laid; and so " hard " did the old bird sit, that I several times carried the box into the house, a distance of forty or fifty yards; and she never evinced any wish to escape. It is true I closed the openings; but she made no effort to stir from the nest. The result of this experiment was just what I wished, the young birds " flew," to the great discomfort of the old gardener, who thought I must be either a " fool, or a soft," to train up a brood of such mischievous little creatures. For myself, I believe they do much more good than harm: though the gooseberry trees do suffer a little from their depredations, yet they are almost harmless, even among gooseberry trees, compared with several other birds.

I hope this narrative may induce some others to avail themselves of similar favourable circumstances; and to give the birds a house to live in. I had but little hope that they would take possession of my boxes; and was much ridiculed for thinking of such a thing; they however showed more thankfulness than I gave them credit for. — *Aliquis. Manchester*, *21st of 3d month* (*March*), 1832.

On the question of which exceed, the " benefits or injuries resulting to man from Pàrus cærùleus," I may cite evidence from Cambridgeshire. In the north part of this county, the cultivation of fruits, especially of gooseberries and currants, as well as that of vegetables, is extensively practised. Through these gardens the titmice, in some numbers, but far fewer than occur in districts more wooded, range in winter, and, with unwelcome industry pick out, or mutilate in their attempt to pick out, buds innumerable, principally, I believe, of the gooseberry bushes, but occasionally not omitting those of the plum, of the cherry, and of other fruit trees. The gardeners vow, and assiduously practise, vengeance against them for these depredations, whenever, wherever, and by whatever means, they are able. The gardeners assume, not troubling themselves with wide examination and tedious induction from it, that the titmice subsist on the buds they extract; and this assumption is probably the truth; for, in long and severe winter frosts, with the ground covered with snow, it is not easy to conceive where a due supply of carnivorous food, including insects in this, can be procured to sustain them; and surely it is too hypothetical to urge that the disbudding achievements, which are undeniable, of these birds, are but the incidental and unintentional results of their diligent research for the eggs and larvæ of insects which may be contained in the buds they pick out. The best of optimists would scarcely argue that enough of these eggs and larvæ would be acquirable, by the utmost diligence of the titmice, to sustain their existence. *Scólopax rustícola* has (Vol. IV. p. 428.) shown that the bullfinch does, during winter, actually feed and subsist on the buds of cherry trees, and takes these buds alone for the sake of the food they in themselves supply.

On this question of the merits or demerits of the blue titmouse, I have, since the receipt of Aliquis's communication, submitted a query to my father, a gardener and grower of fruit at Waterbeach, near Cambridge; in which village and the neighbouring ones, the blue titmouse is called "the bluecap," and the name of "tomtit" is there only applied to the common brown wren, although this latter is there also frequently called "jenny wren." My father replied —

"The little bluecaps are accused of picking off the buds of the gooseberry bushes; perhaps justly: hence they are destroyed as much as possible; principally by traps baited with animal *fat*; a proof that, if they ever live on vegetable food, they are driven to do so by hunger. Shepherds hereabouts, when a sheep of their flock dies of disease, are in the habit of flaying it, and hanging up the skin to become dry, on which usually rather numerous minute fragments of flesh are left remaining: all of these the bluecaps will pick off with diligent greed, and, in short, feast on any thing that contains any animal matter. A kinsman, a shepherd, now with me, remarks, that, in hanging up the joints of dead sheep, in reserve for the dogs, the bluecaps make claim of a share, and are fond of it as cats are. I never destroy the bluecaps, and I believe my crops are usually quite as good as those of my neighbours. On April 8th, the bluecaps were very busy amongst the blossom buds of my pear trees. I did not perceive that they destroyed any of the buds: they appeared to me to only strip off the outer investing scales, with a view to find insects. I afterwards went and examined the buds with a microscope; and the greater part of the blossom buds were healthy, but some few were injured. I found in them a minute transparent globule of fluid, of the texture of jelly, with its centre darker than the outside. I made up my mind that these minute particles of matter were the objects for which the bluecaps had been seeking, and I have no doubt that these globules of matter are the egg of some insect; so that, if I am right, the bluecaps had been usefully employed. A pair of bluecaps, in 1829, built their nest in a hole of a wall here; when the young were hatched, I have seen them, when I have watched them for a quarter of an hour at a time, bring caterpillars in rapid succession to feed their young. Although they may do harm when driven by hunger, I think them useful birds to the gardener; I prefer feeding them to destroying them. Many persons are prejudiced against them, because they will not allow themselves to think, and to examine bluecaps. Bluecaps [the blue titmouse] are not very numerous in this neighbourhood." — *J. D. sen.* *April* 16. 1832.

Of the blue titmouse it is stated, in Rennie's *Montagu's Ornithological Dictionary*, p. 513.: — "In the summer, insects are its chief food; in search of which, it plucks off a number of young buds from fruit and other trees." This remark is either erroneous or incomplete; for the disbudding operations of the titmouse, as it is shown above, are the more formidable in winter, when insects are not obvious; and in summer, when insects abound, it is probable that the titmice leave the buds of all trees wellnigh unmolested.

Bingley, in his excellent *Animal Biography*, has the following sketch of the general habits of the titmouse family: his remarks, it should be remembered, relate to exotic species as well as to the British. The remarks are these: —

"This is a diminutive but sprightly race of birds, possessed both of strength and courage. Their general food consists of seeds, fruit, and insects, and a few of them eat flesh. Some of them will venture to assault birds that are twice or thrice their own bulk, and in this case they direct their aim chiefly at the eyes. They often seize upon birds that are weaker than themselves: these they kill, and, having picked a hole in the skull, eat out the brain. They are very prolific, laying eighteen or twenty eggs at a time. Their voice is in general unpleasant."

Without undertaking to answer for its generic applicability, I may jocularly notice, that *pertinacious prehensiveness of talon* is a characteristic of Pàrus cærùleus; a fact that was fearfully familiarised to me in very early life. In an outhouse of my father's some flesh was hanging, to which, on the door being left open, a blue tit made access, and, being observed there by me, and a senior relative, now no more, was detained in the outhouse, and captured, and given to me. I was very eager to receive Pàrus cærùleus, but more so to relinquish it; for, having escaped from my hand, the terror-stricken little creature struck its talons so tenaciously into a part of my dress, as to require some effort to displace it. — *J. D.*

The Greater Titmouse (*Pàrus màjor* L.) — This species, it is stated in *Rennie's Montagu's Ornithological Dictionary*, p. 350., "has all the habits of the blue tit." Some original remarks, however, on the greater titmouse, from our practical and valuable correspondent J. M., have long lain by us, which we now present: —

"Jan. 20. (1828.) This bird calls. Although both sexes of this species are most useful birds in gardens during summer, living entirely on the caterpillars which infest fruit trees; yet, in winter, if the weather be severe, they fall on and destroy the flower-buds of plums, apricots, &c. In the same season they frequently kill the tenants of the apiary. Placing themselves at the entrance of the hive, they rap smartly with their bill against the edge of the door, which soon brings an unfortunate sentinel within reach, who is instantly seized by the middle, carried to a neighbouring tree, and beat to death. They eat the head and thorax only, rejecting the abdomen! The writer has often been obliged to shoot the birds which took to this way of living, to preserve the bees. [See also Vol. III. p. 476.] They have no regular song, but several sharp and lively calls, expressive of love, joy, and fear: they are among the first to give notice of the approach of the hawk, cat, or fox; and dart into the thickest bush for safety. They breed and roost in holes of walls, and in hollow trees; and the same pair, or some of their progeny, will occupy the same hole for many successive years." — *J. M. Jan.* 20. 1828.

Strange Choice of Residence of the Greater Titmouse (*Pàrus màjor* L.) — Sir, Some birds, like some other bipeds, select strange and singular situatious to build in, and seem desirous to have their business in troubled places. From early youth I recollect a greater titmouse (Pàrus major *L.*), or Tom Noup (as we call him here), has annually, or nearly so, built in my pump, where there is a nest and eggs at this moment. It is placed just under the top of the handle, where that lever bends, and is joined to the piston by a swivel. The only entrance the bird has is close over the handle, where the slit runs a little higher, to allow it to rise above its fulcrum. This pump is used every hour; and is always accompanied with much noise, and violent agitation; and, frequently, for negligent want of Tristram Shandy's "three drops of oil," will "on its hinges grate harsh thunder:" yet the bird sits on, quiet and unmolested. If the handle be lifted up, and she be peeped at longer than she like, she merely puffs, blows, and snorts at the curious intruder. The quantity of moss carried into this receptacle of little ease would thrice fill the crown of a man's hat; and on one side, to prevent any of it falling into the tube or bucket, she exerts an act of reason (an *article* not confined to, nor over-abundant in, the genus *Hòmo*), by placing small sticks as props; a material this bird never uses in her regular foraminous architecture. When the young are hatched, the parents feed them constantly, entering through the small aperture; as the callow brood come to days of indiscretion, one or more will sometimes crawl to the edge, and fall on the surface of the water, and so get ejected through the spout; when it greatly pleases me to see my servants replace them gently in the nest, with kind soothings or facetious chidings; showing that natural humanity is innate in very many of the labouring classes, till effete for lack of nurture, or corrupted by evil communications; and makes me the more lament and execrate that cold, callous, and ignorant opposition, the coarse, big, and burly rich throw on the proper education of the people; which I most ardently pray God may speedily and effectually become unlimited and universal. — *John F. M. Dovaston. Westfelton, near Shrewsbury, May* 1. 1832.

Habits of the Marsh Titmouse (*Pàrus palústris* Lin.) — I have been much surprised, this spring, at witnessing, in two or three instances, the tenacity with which the marsh titmouse attaches itself to its nest. Being in a wood near my own house, I perceived a pair of these birds in one of the trees; and having seen them in the same place several times before, and being desirous of finding the nest, I sat down to watch their motions. After examining me on all sides, with much chattering, and many gesticulations indicative of dislike and suspicion, the female flew to the root of a tree three or four yards off, and disappeared. As she had gone to the opposite side of the tree to that on which I sat, and as there were several holes about the root, I was at a loss to know in which the nest was built, and began to strike the root with a stick, expecting her to fly out; but nothing appeared. I then examined the holes one by one; and, whilst doing so, heard her hissing and puffing from within, in such a way, that, if I had not known she was there, I should have thought it was a snake rather than a bird. However, as she would not come out, and the hole was so small that I could not get my hand in, I was obliged to raise the siege until next morning, when I returned, armed with a hammer and chisel, with which to storm her citadel. As the wood was sound, the hole small, and the nest 6 in. or 8 in. within the tree, I was five or ten minutes before I could get to it; during which time I gave her repeated opportunities of escaping, if she chose; but she still sat on her nest, puffing and pecking at a stick that I thrust in, in order to drive her off. She at last crept upon the farther edge of the nest, which I then took out, as I wanted it for one of my friends, who is a collector of eggs; but, on attempting to blow one, I found they were too far advanced: and I then felt desirous of seeing whether the old bird would hatch them, after having her nest torn from under her; and I turned back to the tree where I had got them, and found her still sitting in the hole from which her nest had been taken. I regret to add, that the humane part of my experiment did not succeed, as she left the nest immediately after, and did not return to it again.

Another instance which I witnessed was in a nest containing young. This was also at the root of a tree. But the situation did not appear to be so well chosen as is usually the case with the titmouse tribe; for, in this instance, the hole went quite through the tree, and, on one side, was large enough to admit the hand. As the young ones were exposed to the weather, and were also liable to be seen by any one going along the adjoining footpath, I attempted to remedy this defect by covering the larger hole with a sod, which, to a casual observer, would appear to have grown there. On taking the sod off one day, to see how the nestlings were going on, I perceived that a clod of earth had fallen from the sod upon them; and I took a stick and hooked it out, fearing it might smother them. Whilst I was doing this, I perceived the old one sat on the farther side of the nest, so still and quiet, that, until I perceived her eye, I fancied she was dead; and she also endured several pokings with the stick before she would move, although the hole on the opposite side of the tree enabled her to escape whenever she thought proper.

Perhaps Mr. Rennie, in his next edition of *Montagu's Dictionary*, will give us a new name for this bird, as the one it has at present is no more applicable to this species than it is to the Pàrus màjor or to Pàrus cærùleus, and not half so much so as it would be to the Pàrus biármicus; and he has changed good names into bad ones with far less reason: witness *Córvus* frugílegus into *Córvus* prædatòrius. The former name is strictly applicable to that species, and to that alone; and so useful a bird does not deserve the name of *thief.* The chaffinch (which received its name of cœ̀lebs from Linnæus, on account of the males alone remaining in Sweden during the winter; which fact is corroborated by White, who found scarcely any but females in Hampshire during that season) has had its name changed by Mr. Rennie into *Spìza.* The old name is characteristic of a remarkable fact in the economy of this bird; why the new one is more appropriate (neither understanding Greek, nor having read Aristotle,) I cannot say: will Mr. Rennie condescend to enlighten me? Once for all, if we are to have a new nomenclature, let a committee of able naturalists decide upon it, or let us submit to the authority of a master (for instance, Linnæus or Temminck); but do not let every book-maker who publishes a work on natural history, rejecting names well established and universally received, give new ones, in such a way as serves only to show his own presumption, and to confuse what it ought to be his business to elucidate.—*T. G. Clitheroe, Lancashire, June* 30. 1832.

Sìren l*acertìna* L., *some Notice of the Habits of; abridged from a printed Copy, sent by Mr. Neill, of his Communication on the Subject, in the Edinburgh Philosophical Journal for April,* 1832. —The individual specimen here figured (*fig.*116.) was received alive by Dr. Monro, in 1825, from Dr. Farmer of Charleston, South Carolina, where specimens of the animal occur sparingly in the rice marshes; Mr. Neill believes that it also occurs in the creeks of the Mississippi and Ohio rivers; because, on showing it, in the spring of 1830, to Mr. Audubon, this gentleman recognised it as an old acquaintance; he having witnessed specimens being occasionally taken in those latter places, in the trawl-nets, by the fishermen, who called the animal water-dog or water-puppy. The live specimen came to Dr. Monro in a small barrel, having a perforated lid, and the lower part containing some of the mud native to the reptile's place of capture, among which it nestled. Dr. Monro confided it to the well-known care of Mr. Neill, Canonmills, near Edinburgh, who received it of Dr. Monro in June, 1825, and kept it alive till October, 1831; that is, for the

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space of six years and four months; and Mr. Neill conceives that, as M. Bosc, when in America, failed to procure a live specimen for the collection of animals at the Jardin des Plantes, his was the only living example which has been seen in Europe. Mr. Neill thus describes the habits of the animal, as observed in captivity, and his own mode of treating it:— "At first I placed the animal in a water box, containing a quantity of hypnum and sphagnum, and set the box on the trellis of a green-house or conservatory. One evening in May, 1826, the animal made its escape over the edge of the box, and must have fallen nearly three feet. It had on that occasion remained from ten to twelve hours out of the water; but it had burrowed in moist earth during most part of that time. The branchiæ were doubtless to a certain degree dried, and thus obstructed; and it evidently took some time before they could freely perform their accustomed office. An excellent drawing of the siren, the best that has been published, was made by Syme (now of Dollar Academy) for No. vi. of Wilson's *Illustrations of Zoology*. In the process of taking the drawing, 'the siren was kept for several hours, on different days, in a shallow white assiette [plate or dish], with merely a sufficiency of water to preserve the gills in a moist state; and the animal repeatedly got upon the table, and even made its way to the floor, but did not at all suffer from this degree of exposure to the atmosphere.'

"In April, 1827, I transferred the siren's reservoir to a bark-stove or hot-house. Here it became more lively, and ate earthworms, bansticles, and small minnows more greedily.

"During the years 1829 and 1830, and down to October, 1831, the animal continued to inhabit the same reservoir in the hot-house: but we had discontinued the use of mosses; as these rendered the water turbid, particularly when the sphagnum began to decay. I may here notice, however, that the turbid state of the water had enabled us to make one slight observation. The minute particles of decayed sphagnum were so exactly of the same specific gravity as the water, that they floated about in evey possible direction; and during sunshine, when the siren was lying perfectly quiescent at the bottom, gentle currents were discernible, by means of these particles, constantly flowing from the clefts in the branchial apparatus, and occasionally exciting languid motions in the delicate fimbriæ at their extremities. We thought that we observed in the animal a preference for pure water, as it regularly became more lively as often as the water was changed; and we found by experience that any floating foliage, that served to hide or cover it, was highly agreeable to its disposition. We therefore at last adopted the plan of keeping a large patch of frogbit (Hydrócharis mórsus rànæ *L.*) constantly vegetating on the surface. This tended also to keep the water from corrupting. When this floating patch was slowly moved from side to side of the reservoir, the siren kept most accurately beneath it, endeavouring to avoid observation; and in this exercise it showed great alertness and sagacity.

"On the morning of the 22d October, 1831, the siren was found by the gardener lying dead on the paved footpath of the hot-house, not far from the reservoir. It did not appear to have met with any injury in its fall from the reservoir, which was placed on a trellis about 3 ft. above the pathway. The fall, indeed, must have been broken by intervening flower-pots, and no external marks of lesion [hurt by bruising] appeared on the body. The fine fimbriæ of the branchial apparatus, however, were completely dried and shrivelled up; and I have no doubt in my own mind that the death of the animal arose from this cause. The older naturalists supposed these fimbriæ or fringes to be opercula or gill-covers, and regarded the vertical clefts or perforations in front of the fringes as the true gills; but Mr. Wilson is certainly right in considering the fringes as the true gills.

"In the *New York Medical and Physical Journal* for June, 1824, Dr. Samuel L. Mitchell gives an account of the examination of several specimens, dead and alive, which had been transmitted to New York by the same Dr. Farmer of Charleston who sent the living specimen to Edinburgh. Dr. Mitchell seems to think it most probable that the air-sacs, called lungs, do not perform any direct respiratory function, but are mere receptacles of air, performing only an auxiliary service, in occasionally furnishing the branchiæ or gills with the atmospheric air which the animal from time to time inhales, and which is detained in these receptacles till wanted. I cannot help thinking that this view acquires additional probability from the circumstance of the Canonmills siren having died without any other apparent cause than the exsiccation of the extreme fimbriæ or fringes, that is, the true gills."

During the six years and four months through which Mr. Neill kept the *S*ìren *l*acertìna, he states that "no structural change took place, nor was the slightest tendency to any such change discernible. The animal had evidently increased in size. When it arrived, it was nearly a foot and a half long. When it died, it was fully twenty inches in length; and it had also perceptibly increased in grossness. It may, therefore, I think, be pretty confidently concluded, that it is no larva, though Pallas and De Lacépède considered it in that light; but a perfect animal, according to the view early adopted by Linnæus, and now sanctioned by Cuvier."

Mr. Neill's late excellent gardener, Mr. Alexander Scott, having now become a neighbour of ours, in the capacity of foreman of the glasshouse department of Knight's exotic nursery, Chelsea, we solicited him for any supplementary fact which he might be able to supply; and he has communicated as follows: —

"When drops of water fell from the glass of the hot-house into its box, it generally got upon its paws, on the sharp look-out for food, and would suddenly suck in the water, as if it had succeeded in catching something. The only hint it had of its prey was from the impulses or motions given to the water, and not by sight, as was evident from its manner. It would rise upon its feet, push its nose out of the water, or search along the bottom, making attempts to catch if the prey was near it, but generally in every direction but the right one. This was the case, in whichever way the object was placed; at top, bottom, or at any intermediate position in the water. It would eat a small minnow at a time: if the minnow were large, it would bite a piece out of it. Sometimes it would eat as many as three at a meal; but this would serve him for a week. A large earthworm required some exertion to get swallowed. The siren would at once suck it in, as if by magic; the worm would be as quickly darted out again, the siren still retaining hold of one end, when it would again draw in the worm, masticating it as it proceeded; it would then, in an instant, be sucked in. I once heard it make an indistinct noise, resembling the croaking of a frog, but less distinct: it was a very sluggish animal, and, unless for its food, seldom moved out of its retreat, not probably for days, if undisturbed." — *Alexander Scott. Chelsea, May* 25. 1832.

Flint, a writer on America, in his *Geography and History of the Western States*, vol. i. p. 119., thus speaks of the *S*ìren *l*acertìna, under the name of *Muræ`na S*ìren: — "It somewhat resembles the lamprey, and is nearly 2 ft. in length. It seems intermediate between the fish and the lizard class. It has two short legs, placed near the head. It is amphibious, and penetrates the mud with the facility of a crawfish." The following notice of the *S*ìren *l*acertìna occurs in Turton's *General System of Nature*, vol. i. p. 671.: — "Body eel-shaped, tailed, naked, compressed, sometimes 1½ ft. long; brown speckled with whitish; feet two, placed in the manner of arms, four-toed, and furnished with claws; gill membranes three on each side, toothed or feathered; tail bony. Inhabits muddy and swampy places in South Carolina; lives generally under water, but sometimes appears on land; feeds on serpents, which it holds firmly between its jaws; is in structure between the amphibious and fish tribe, being furnished with external gills like fishes, and with feet like the amphibia; has a sort of squeaking or singing noise; when thrown on the ground, breaks in pieces like some of the serpents." It should be remembered that the latter information is slightly stale, and was but received on trust by Linnæus himself. — *J. D.*

Singular Variety of Limenìtis Camílla. — Sir, The accompanying specimen of Limenìtis Camílla was taken two or three years ago, by my friend the Rev. H. Maclean, in the High Woods, near Colchester, in the month of July. It constitutes so singular a variety, differing as it does so widely from the usual appearance of that insect, that I have thought a notice and figure of it might prove interesting to your entomological readers. The peculiarity of this variety consists in the wings above being entirely of a sooty black (*fig.* 117. *a*); and, consequently, destitute of the white markings, and elegant white fascia, or band, which form so striking a character in the ordinary specimens (*b*) of L. Camílla. A few lighter spots, however, are visible here and there, both on the anterior and posterior wings; just serving to trace out, very faintly and obscurely, the mere rudiments, as it were, of the usual white marks and fascia. The cilia are white, as in other specimens. On the under surface of the wings the white fascia is also wanting (*fig.* 118. *c*), and the spots and markings are far less numerous and distinct than usual (*d*). The colouring, likewise, is less brilliant, the tints being blended together, and softened into

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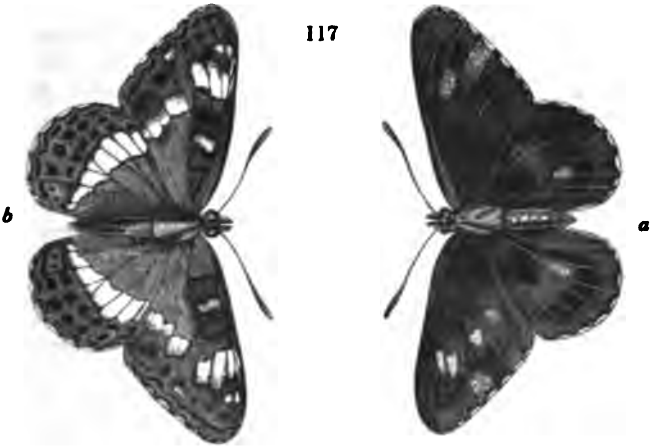

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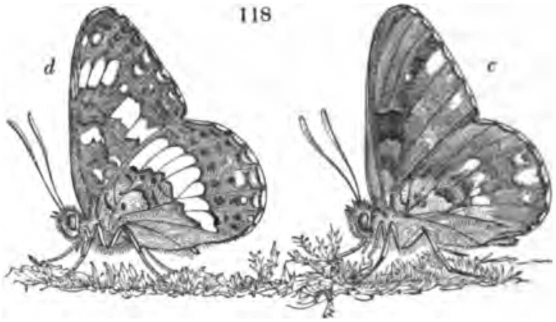

each other, in a way which it is not very easy to describe accurately in words. I have seldom seen a more strongly marked variety of any lepidopterous insect; and yet any entomologist acquainted with Limenìtis Camílla would, I conceive, at once, without hesitation, pronounce it no more than a variety of that species. I am, Sir, yours, &c. — *W. T. Bree. Allesley Rectory, June* 14. 1832.

Small Fishes are destroyed by other Insects, besides the Larvæ of Dragon Flies as instanced p. 519. — In Vol. III. p. 148., J. Elles describes the fact of a small fish being killed by "the water beetle," to which it had been experimentally introduced in a basin of water. He remarks, that, after the beetle had killed the fish, "it never left it till it was a perfect skeleton, similar to numbers that he [Mr. Elles's neighbour] had found." Another correspondent (B., Coventry) has subsequently (Vol. IV. p. 476.) asked, of what genus and species was this "water beetle?" but the query at present seems not to have met the eye of Mr. Elles. — *J. D.*

Five Specimens of Cicàda hæmatòdes, captured in the New Forest. — Sir, In July 1826, while ranging in the New Forest, Hants, between Lyndhurst and Brockenhurst, persevering in my search after rare insects, I was delighted at length on discovering a specimen of Cicàda hæmatòdes, resting on the stem of the fern [*Pt*éris aquilìna]. The sun was shining at the time, and the day was intensely hot. I had previously been at a very great loss in what manner I should procure a specimen of this scarce insect for my museum, — knowing that it had been vigilantly sought after by the most diligent collectors for many years, and that its history and manner of secreting itself had never been recorded by naturalists. I was, it is true, aware of the general supposition, that it took its flight by night, or in the dusk of the evening; but this was information more likely to mislead, than to guide me to the discovery of what I so anxiously sought after. I have, nevertheless, spent numbers of dreary hours in that extensive forest at these periods, without the desired success, and was certainly fortunate in my discovery at last, by accident rather than by intention. I may here observe, that the insect either appears sluggish in its habits, or is altogether unconscious of its danger, as it suffered me to approach and take it off the stem of the fern without making the slightest effort to escape. A few days after taking the first, I discovered a second, and very fine specimen, in the same situation; and, two days after this, I caught another in my net. From the nature of the flight of this, I had imagined it to be the Œ́strus bòvis, as it exactly resembled the flight of this insect, except that the duration of the flight of the Cicàda hæmatòdes is short. The first insect had evidently flown some time, from the wasted state in which I found it. I was strongly reminded at the moment of an observation of that eminent entomologist, Mr. Haworth, in describing a rare insect, — "It had rather overtravelled." I have taken five specimens in the course of my researches, by watching their passage, going immediately to the spot, and taking them up with my finger and thumb. The Cicàda moves only when the sun shines, and in the direction through the New Forest, from Lyndhurst towards Brockenhurst, keeping on the left hand side of the turnpike road, about the space of from half a mile to a mile within the forest; and this I believe to be the only locality in which it has hitherto been taken. The reason why more have not been captured, I should imagine to be this, that, from its flight, it has been generally imagined to be a very common insect. I am, Sir, yours, &c. — *R. Weaver. Temple Row, Birmingham, Nov.* 28. 1831.

Extensive Ravages committed by the Caterpillar of the Tórtrix viridàna on the Leaves of Oak Trees, in Surrey, in the last Three Years. — Sir, Of the power possessed by insects individually small, and of little importance, when united together in numbers, of defacing the beauty of a country, we have full proof in the accounts we read of the wandering locust, that ravages the East and Northern Africa; leaving, in its passage, what was smiling in verdure, a dreary and desolate waste. In our own, in that respect, more fortunate land, we had almost deemed ourselves free from such extreme devastation; but for the last three summers we have been visited by a plague scarcely less unpleasant, though certainly less generally terrible in its effects. It is now for three successive springs that the fine oak woods filling the valleys in the neighbourhood of Haslemere have been infested with the caterpillar of the Tórtrix viridàna, to so considerable an extent as completely to destroy the beauty of their appearance; giving them worse than the semblance of winter, when they should be clad in all the full luxuriance of June. Three years since, I first noticed this small and elegantly formed pale green moth, issuing in numbers from pupas that had filled many a curled oak leaf, and, seeing it for the first time, was struck with its loveliness, although I could not but be conscious, that, in a former state, it had been carrying on a work that had done much detriment to my favourite oaks. The mischief was then, however, not so great, at least in the immediate vicinity, as it was the following spring, when this little insect was regarded as a very pest, so perceptible were its ravages in the blackened appearance of the oaks, soon after they first put forth their delicate leaves, and began to assume the hues of summer. Indeed, the larvæ then became a perfect nuisance: hanging suspended by long silken filaments from each infested tree they had so completely stripped of its leaves as not to leave a sufficient number in which to enclose themselves, and therefore obliged to descend to the undergrowths to seek a habitation, they were ever dangling in the faces of those unfortunate enough to walk unconsciously beneath the far-spreading branches. Nor were they less unpleasant when they issued from the chrysalis; coming forth in such numbers that they produced a sense of suffocation in those that wandered amidst them, as they covered the leaves of the underwoods, and fluttered in countless multitudes around. It was then a subject of rejoicing to see them preyed upon by their natural enemy, the *E*′mpis lívida, an insect of less than their own size, that, fixing on one something in the manner of the stoat upon a hare or rabbit, would in this way fly about with it until it had sucked its juices, and would then discard it for another. This year the destruction is yet more terrible; and those that have not witnessed it will find it impossible to conceive the dismal appearance that is thus given to the features of a really beautiful country. To see whole woods of oak looking like the blighted forest of the Eastern tale, stretching forth blackened and dark, when all else is green and luxuriant, is at once painful to the eye and to the feelings, at a season when we expect nothing but loveliness; when the fair sun is shining clearly and brilliantly on a scene that would, without this cheerless blot, be almost perfection.

Examine an individual oak more closely, and the sight becomes yet more revolting. It is covered with the remains of skeleton leaves, curled up, and surrounded with a filmy web; its trunk and branches have a misty appearance, as if enveloped in white gauze; and here and there hangs suspended a long web, or a caterpillar that has not yet found for itself a habitation in which to undergo its final change.

I am not certain whether the same trees are infested this year as on the preceding ones; but I rather believe not. As far as my observation extends, the moths seem passing onwards, taking the country, as it were, in streaks across from north to south. If it should be so, I for one shall be most happy when they have passed away from this part of the country, and cannot wish them any better fortune than that they would find a refuge in the sea; but from this I fear instinct will be their preserver.

Perhaps I have already trespassed too long on your patience, with what may have little interest for any but those subjected to the ravages of which I have endeavoured to convey a faint idea; but it is, Sir, in the hope that some of your readers will acquaint me, through the medium of this Magazine, whether any other parts of the country have suffered in a similar manner, or whether they remember a like circumstance in any former times; as my own memory, extending to more than twenty years, does not afford me any instance of effects produced by such a cause, at once so complete and so mournful. I am, Sir, yours, &c. — *C. P. Surrey, June* 7. 1832.

Oak trees are somewhat numerous in Kensington Gardens; and, from their leaves and branches, in hot sunny days, in the latter half of May, and in the earliest days of June, 1832, almost millions of small caterpillars might be seen depending on threads of every length. The day on which I first happened to see them was the 18th of May, a sunny day; but that they were visible previously is certain from the fact, that the caterpillars, which are of a lead colour tinted with green, and sparingly hirsute, were then, some of them, half an inch long, and depended on threads seven or eight feet long. So abundant were they on some oak trees, that the excrementitious matter from them kept falling, and tinkling on the grass blades below, so frequently, as to give the idea of a sprinkling of rain being then falling. Now, June 10., the oak leaves look seriously the worse for the ravages of these creatures, which, owing possibly to the late rains, are scarcely to be seen depending on their threads, and riding, as they were before, in see-saw luxury, as the gentle breeze (and there is ever a breeze under trees) might sink or swell. The margins of many of the gnawed oak leaves are rolled up, and in some of the involutions are pupas, but in many of them the tenants are still caterpillars, and I suspect that these have yet scarcely fed their fill, but will, when sunny weather returns, sally forth, to resume and complete their manducations. The pupas are black. In some cases, a colony of some fifty or a hundred individuals seem to start off, almost contemporaneously, from some point in a branch, and each makes the best of its way to the earth. In one such instance, which I witnessed, the individual threads (for every caterpillar provides a thread for itself), from their emanating from an almost common point, became blended into one, for the first two or three feet from the point of suspension; and owing to a difference in the vigour of the respective caterpillars, or, perhaps, from differences in their time of starting, they were to be observed in every stage of progress in their downward journey to the earth. I suppose that, without a question, these Kensington Gardens caterpillars are identical as to species (Tórtrix viridàna) with C. P.'s Surrey ones. In a look round Bury St. Edmunds, in the middle of July, I saw a few oak trees; but they did not seem to have been obviously attacked, to any injurious extent, by caterpillars.

August 18. In a densely planted part of Kensington Gardens, there is a large proportion of lime trees, lofty from having been drawn up in their youth, the spring-borne leaves of which have been especially ravaged by the caterpillars of some species of insect. The skeletons of the old leaves, contrasting with the perfect entire leaves produced since midsummer, have a conspicuous and miserable appearance when looked up to from the ground. Similar skeletons of leaves abound on the few hornbeam trees, and numerous elm trees, which Kensington Gardens contain. — *J. D.*

The Possibility of introducing and naturalising that beautiful Insect the Fire Fly. — It abounds not only in Canada, where the winters are so severe, but in the villages of the Vaudois in Piedmont. These are a poor people much attached to the English; and, at 10*s*. a dozen, would, no doubt, deliver in Paris, in boxes properly contrived, any number of these creatures, in every stage of their existence, and even in the egg, should that be desired: and if twenty dozen were turned out in different parts of England, there cannot remain a doubt but that, in a few years, they would be common through the country; and, in our summer evenings, be exquisitely beautiful. — *A. X.* *Feb.* 8. 1832.

Vigne, in his *Six Months in America*, says: — "At Baltimore I first saw the fire fly. They begin to appear about sunset, after which they are sparkling in all directions. In some places ladies wear them in their hair, and the effect is said to be very brilliant. Mischievous boys will sometimes catch a bullfrog, and fasten them all over him. They show to great advantage; while the poor frog, who cannot understand the "new lights" that are breaking upon him, affords amusement to his tormentors by hopping about in a state of desperation. — *J. D.*

MISCELLANEOUS INTELLIGENCE.

Art. I. *Retrospective Criticism.*

This Magazine monthly. — I hope the majority of your readers will induce you to publish the Magazine monthly, as you propose to do: to me it will give it an additional interest; for, having experienced this interest now for the last five months [in consequence of our having published the two extra Numbers], I shall regret not receiving a Number for August. I am, Sir, yours, &c. — *J. D. Salmon. Bourne, July* 9. 1832.

Sir, I am much pleased to learn, from the cover of your June Number, that there is a prospect of the Magazine of Natural History being published monthly, instead of, as it now is, every alternate month. The change would be much for the better; for by this plan a current of natural history news would be, as it were, uninterruptedly flowing forth to quench the thirst of your readers. The wide circulation of the Magazine begets readers, and readers beget contributors; so that a press of matter, no doubt, is accumulating upon you from sources out of number, and will accumulate more and more every day —

> " As if increase of appetite had grown
> By what it fed on."

I may add, too, that the patience of your contributors would not be put to so severe a test by those long delays which, under the present plan, sometimes unavoidably take place, before room can be found to insert their various articles. As the proposed alteration (it is stated) will depend on circumstances, and particularly on the wishes of your readers (which you request may be made known to you), I lose no time in giving my vote, as an individual subscriber, decidedly in favour of the *monthly* publication of the work. — *W. T. Bree. Allesley Rectory, June* 26. 1832.

Several other correspondents have also obliged us with their opinions on the proposed change; and of these some approve it: others do not, or propose doubling the number of sheets and price, and preserving the two-monthly publication, &c. We shall be happy for a still wider expression of opinion. — *J. D.*

Mr. Dovaston's " Chit-chat" has my entire approbation; and I anticipate much pleasure and information from a continuation of the series he has commenced. — *J. D. Salmon. Bourne, Lincolnshire, July* 9. 1832.

Extracts from a private Letter from Mr. Waterton. — . . . . . " Mr. Dovaston's mentioning me [p. 497.] far too meritoriously, puts it out of my power to say much of his " Chit-chat," otherwise I would not have hesitated to tell you that I consider it most excellent and instructive, and of real worth to your Magazine." . . . . . — *Charles Waterton. Walton Hall, July* 24. 1832.

We trust to Mr. Waterton's friendship and liberality to pardon this freedom; and have to inform Mr. Dovaston, that other correspondents have expressed their approbation of " Chit-chat, No. 1.," and, like ourselves, are anxious for the favour of " Chit-chat, No. 2." — *J. D.*

Mr. Dovaston's Descriptive Sketches of the British Singing Birds. (p. 425—428.) — " I had lately an inkling to have offered you some remarks on many of our warblers' melodies, and the language of birds, both their poetry and prose; but it has been so ably," &c. — *Mr. Dovaston.* (p. 427.)

Sir, I regret, and I am sure many of your readers will feel disappointment, that I have been unwittingly the cause of depriving them, as well as myself, of a treat from the pen of your ingenious correspondent, Mr. Dovaston. That gentleman, it appears (p. 428.), had intended to have sent you some account of our feathered minstrels, which, as related in his peculiar strain, would have been a treat indeed. This purpose has been partly relinquished, merely because I have already written something on the same subject. But why, I beg to ask, should my homely remarks preclude those of Mr. Dovaston? The latter can only be *second* in order of time; and, in this case, as in all others, the *second* would give not only brilliancy of *tone*, but enhance the value of the *first;* for, assureally, whatever *notes* are drawn from Mr. Dovaston's *score*, will always be not only on the most melodious *key*, but with infinitely more *expression* than any *execution* of mine can possibly elicit. Besides, my *notes* may require correction; at any rate, they are capable of *variations* and numerous *graces*. An *accompaniment*, therefore, from a master hand, who can so well *give sentiment to sounds*, would not only embellish the attempt of the first performer, but command attention to a source of unalloyed pleasure, which many are unconscious of, merely from ignorance that there is at this season of the year, a free concert, by the *First Master*, arranged for their entertainment in every grove. — *J. Main. Chelsea, June*, 1832.

Cats kittened with short Tails. (p. 276.) — I have never seen a short-tailed cat; but I have heard that the Isle of Man boasts a breed of mousers kittened without that decent and graceful ornament. — *X. April* 6. 1832.

The facts on the Suffolk short-tailed cats (p. 276.) were stated from memory; and, in consequence, from fear of exceeding the truth, are, as my memorandum since found shows me, scarcely the whole of the truth. By this memorandum, I first observed the short-tailed cats, in the places mentioned, as early as Nov. 8. 1822: there were then five living in the village of Livermere; and they were all reported as keen mousers: their tails, or stumps of tails, were less, rather than more, than 2 in. in length. Could this peculiar breed have arisen from progenitors whose tails had been amputated? — *J. D.*

Habits of the Night Jar, or Fern Owl. (p. 603.) — [Since the information supplied on this bird, p. 603., was printed, the following additional facts have been communicated.] The migratory periods of this bird are not well ascertained; but I have known one shot Nov. 27th, 1821, and they had arrived April 28th, 1830. As there is scarcely a British bird of which so little is known, the following notes may be interesting: — It has been seen perched on the bar of a gate, not across, but according to its length, with the tail elevated; uttering its peculiar sounds; but when perching, as it often does, on the summit of a twig of oaken copse, it fixes upright, with the feet grasping the twig, and not sitting; just as the swift perches against a wall. One was killed in broad daylight, perched on the upper side of a sloping branch of considerable size; the head was uppermost, and it rested on the feet and tarsi, the latter being bare on the under surface for that purpose. Its attitude in this situation much resembled that of a woodpecker. One that was kept alive with its wing broken sat across the finger, like another bird. When about to take flight it makes a cracking noise, as if the wings smote together, after the manner of a pigeon. — *J. Couch. Polperro, Cornwall, July* 23. 1832 [*but not received until August the* 8*th*. In Vol. III. p. 30. 188. 296. 449.; and Vol. IV. p. 275. 425., notices of this bird also occur. — *J. D.*]

Parasitical Habits of the Cuckoo (*Cùculus canòrus* L.). — By A. R. Y.'s review of *The British Naturalist*, and an extract presented at p. 62., it appears that the author of that work doubts the fact that the cuckoo (Cùculus canòrus *L.*) deposits her eggs in the nests of other birds. I subjoin the following fact, that came under my observation in the summer of 1829. I had, for two or three days, observed a cuckoo flying about the garden (rather an unusual circumstance), and at the same time a pair of pied wagtails (*M*otacílla álba) constantly following her from one tree to another; and knowing that a pair of these birds had been in the habit of building their nest, for several years past, in some ivy, I was led to suspect that she had destroyed their eggs; and, to satisfy myself upon this point, I was induced to take a peep into their nest, and found it contained six eggs, one of which was much superior in size to the rest, and considerably darker, about the size of that of the skylark (*A*laúda arvénsis *L.*), but more of an oval shape. I have five of them now in my possession, including the latter, which, I have not the least doubt, is the egg of the cuckoo. In blowing them, for the purpose of placing them in my cabinet, I found that they had been sat upon for three or four days at least, by the appearance of the yolks. I have another egg in my possession, which was taken from the nest of a hedge sparrow (*M*otacílla modulàris): with the exception of its being a shade darker, it agrees with the other as to shape and size. The difference is so great between the eggs of the cuckoo and those of the pied wagtail, that I am quite certain that any person with common observation would instantly detect it; and I venture to suggest to the author of *The British Naturalist*, to take a peep into all the nests of the pied wagtails, hedge sparrows, titlarks (*A*laúda praténsis *L.*), &c. &c., that may happen to come under his observation during the months of June and July; and I feel quite satisfied that he will, sooner or later, be convinced that all our authors that have written upon this interesting subject, do not err when they state that the cuckoo always deposits her eggs in the nests of other birds, so that their young may be reared by a foster parent. I am, Sir, yours, &c. — *J. D. Salmon. Bourne, Lincolnshire, Feb.* 16. 1832.

I have known of three young cuckoos that were reared by pied wagtails, and these in the botanic garden at Bury St. Edmunds: at a future day I will narrate the details. Additional facts on the cuckoo's parasitical habits are presented by Mr. Hoy, in p. 277, 278. — *J. D.*

Errors in J. D. Salmon's "Eggs and Birds of the Orkney Islands." — Sir, Please to correct four errors which appear in my article, p. 415—425., and which probably arose from my writing too illegibly. Page 421. line 9. for "scouticurlin" read "scoutiaulin;" p. 421. line 18. for "syre," read "lyre;" p. 422. line 17. for "dunte," read "dunter;" and p. 423. line 13. for "longer," read "larger." — *J. D. Salmon. July* 9. 1832.

The Green Humming-bird. — "Rursus in arma feror." *Virg. Æneid.* "Again I rush to battle." I see, in the last Number, p. 590., that I am accused of abusing Professor Rennie, "through thick and thin," and of treating him "very roughly and unceremoniously." I admit that I have treated him very unceremoniously, to the fullest extent of the word; but I deny the rest of the accusation. I am surprised that any form of language which I have made use of in the Magazine can be construed into abuse of the Professor, for it never was my intention to abuse him. After this declaration, I shall feel sorry, if the readers of the Magazine do not acquit me of intentionally abusing the worthy Professor "through thick and thin."

As to my picking out his "little errors," and thus holding up his *Ornithological Dictionary* to "public odium," I plead guilty: but, let me ask, who threw the first stone? The Professor having found in my *Wanderings* proof sufficient to answer his purpose, that the humming-bird feeds on insects, wrote a paper for Mr. Loudon's Magazine [Vol. I. p. 371.] on "the food of humming-birds;" and he brought me in, under the character of the "eccentric Waterton," as a witness to his home-spun manufacture.

His introducing this wanton epithet was the cause of my buying his edition of Montagu's *Dictionary;* the only one of the Professor's works into which I have ever dipped. The first "little error" which caught my eye, was his specious theory of the incubation of the grebe: and, as he had held me up as the "*eccentric* Waterton" in one Number of the Magazine, I made bold to hold him up, as the *erroneous* Rennie in another.

After this, the Professor of Natural History in King's College in the City of London, solemnly informed the public, in Mr. Loudon's Magazine [Vol. V. p. 102.], that *I had hitherto published nothing respecting the economy or faculties of animals, of the least use to natural history.* This was a fulmination of fearful import, from a high quarter. "Venit in hoc illâ fulmen ab arce caput." My book sank under it. The departed spirit of the *Wanderings* now haunts his faulty *Dictionary!* ever and anon pointing to the numerous "little errors" it contains. But to the subject.

Professor Rennie says, in his "Plan of Study," that "in tropical climates, where the heat is great, such domed nests are very common; and are probably intended to protect the mother bird, while hatching, from the intense heat of a perpendicular sun." How well this theory suits the study! how ill it accords with facts in the field of nature! Should the Professor ever go to Guiana, he will see, in the vast wet savannas of that far-extending region, that the little green humming-bird, not much larger than an humble bee, always makes its nest upon the dried twig of a small, straggling, ill-thriving bush. There is not one solitary leaf near the dried twig, to screen the bird from the rising, the noonday, or the setting sun. Nevertheless, this little delicate creature sits on its hemispherical nest, exposed to the downward rays of the fiery luminary, without the least apparent inconvenience. If, then, the tender little green humming-bird can sit all day long exposed to such an intense heat, surely the larger birds, such as the bunya or cassique, surpassing our magpie in size, cannot be supposed to make a dome to their nests, in order to protect their tough and hardy bodies from the rays of a tropical sun. I think this fact of the incubation of the green humming-bird tends to place the Professor's theory of domed nests amongst his "little errors." I beg to apologise to the readers of the Magazine, for introducing matter foreign to natural history in the first part of this paper. I am aware that it is quite uninteresting to the public. I dislike it myself; but I was called upon by the Professor's anonymous ally. It will be my last. — *Charles Waterton. Walton Hall, July* 21. 1832.

Habits of the Carrion Crow (*Córvus Coròne* L.) — Sir, Touching the carrion crow controversy between Mr. Waterton and Professor Rennie, which has of late occupied some portion of your pages, allow me to step in, and add one word. I have been a birdsnester in the days of my youth, and verily think that the crows, magpies, and hawks, of the present generation, must still owe me a sort of hereditary grudge, on account of the depredations I have heretofore committed on the domains of their ancestors. Like Mr. Waterton, I have frequently mounted up, "*in propria persona,*" to the nests of the carrion crow; and I must say, that on these occasions I never did find the eggs covered with the materials of the lining of the nest, though the birds might be sitting, and away from the nest at the time of my visits. I cannot speak to the habits of the Kentish crows; but, judging from what I have observed in those of their kindred in Warwickshire, I am much disposed to think that the crows in the park at Walton Hall are not quite such "eccentric" beings as Professor Rennie seems to infer; and that the crows about Lee in Kent are rather the more eccentric of the two. Mr. Waterton appears to be a downright matter-of-fact naturalist; he seems to hold most intimate and friendly converse with all the wild animals about him, and to have made himself personally acquainted with their more secret ways and doings. I confess I should feel loth to controvert what he states, on his own authority, as facts in natural history; even though, as in the present instance, the point he contends for involves the necessity of proving a negative. I am, Sir, yours, &c.—*W. T. Bree. Allesley Rectory, June* 26. 1832.

Effects of the Swallow Tick (*Hippobósca* Hirúndinis L.) *on the Swallow Tribe* (Hirúndines).—Sir, The fact related by your correspondent O. (p. 203.), of a swift having been killed by flying against a wall at Hastings, and that mentioned by J. D. (p. 204.), of the same bird, and other *H*irúndines, having been sometimes found alive on the ground, do not appear to me to be sufficiently accounted for on the supposition of the birds having been reduced to extremities by the Hippobósca *H*irúndinis, with which they might have been infested. In the first place, there is no evidence that the swift at Hastings was so infested. O. speaks of "several small reddish insects" running about his hand at the time he held the bird. These could hardly have been the Hippobósca *H*irúndinis, which is nearly, if not quite, as large as a sheep tick (which it somewhat resembles), and of a dirty greenish colour. But, secondly, if the fact recorded by O. is to be attributed to the torture produced by the swallow tick, would not such catastrophes be of more frequent occurrence? Our British *H*irúndines are, I believe, very generally infested with the Hippobósca. On the accidental fall of a martin's nest, during the breeding season, I have seldom failed to find it swarming with the parasites. When swifts have been wantonly and barbarously shot in sport, I have more than once found, upon examination, five or six, or more, Hippobóscæ "playing at hide and seek very dexterously among the feathers of the bird," as J. D. so descriptively expresses it; and yet the swifts, up to the moment of their meeting their untimely fate, were as active and vigorous on the wing as usual, and apparently in full enjoyment of all the pleasures of life. In truth, brute animals seem to be far less incommoded by the vermin with which they are infested, than we should at first suppose. And this fact, if fact it be, may be regarded as among the wise provisions of a beneficent Creator; seeing, as we do, how almost universally animals of whatever kind are subject to their peculiar parasites, of which they have not the power to rid themselves. Butterflies appear to me, though Professor Rennie is of a contrary opinion (see *Insect Miscellanies*, p. 28.), to sport about as usual, totally disregarding the swarms of *A*'cari (?) which adhere to them in clusters (see p. 336.). Hippobósca *H*irúndinis is, indeed, an insect of moment and formidable size, as compared with that of the swift or martin on which it preys; and yet, as already said, these birds, so far as we can judge, appear to enjoy themselves, without being incommoded by the parasite. Some other solution, therefore, I think, should be sought of O.'s problem, than the one proposed, though I am not prepared to suggest any that may be more satisfactory.

Swifts, I am told (though I never witnessed the fact), will sometimes fight with each other, and in such cases the contending parties are occasionally brought to the ground, and have been found so circumstanced, and with the claws of each mutually clasped into those of the other. J. D.'s swift, discovered among the "longish grass in a village churchyard," might possibly have been one of these pugnacious individuals. I once recollect to have caught a swallow (*H.* rústica) alive on the ground (and have known the species caught by others): on being released from the hand, the bird flew away brisk and vigorous. Such captures, perhaps, might be owing to some unusual fatigue or exertion which the birds had undergone, or to accidental temporary injury. If I rightly remember, the swallow in the instance above alluded to, appeared to be asleep at the time it was caught, though the circumstance occurred in the daytime. Yours, &c. — *W. T. Bree. Allesley Rectory, March* 8. 1832.

The *Angler's Museum*, so far as I am enabled to judge by your notice of its prospectus, p. 191.; promises to be a most useful and enticing work. And, as it is stated that, "in the mode of publishing, the form of a magazine has been decided upon," I should be glad to be informed whether it is designed to be a regular periodical, of long and indefinite continuance, or whether the public may calculate on its completion in the course of a moderate period, and within some reasonable limits as to extent. To myself, who, though no very skilful practitioner in the art, am yet a dear "lover of the angle," an ardent admirer of old honest Izaak Walton, and a bit of a naturalist into the bargain, the work holds out many most attractive and bewitching baits. But, like the "burnt child who dreads the fire," [piscator ictus sapit,] I have learned, by experience, to entertain some formidable and justly founded scruples about commencing to "take in" a periodical. Yours, &c. — *A. R. Y.* *March* 10. 1832.

A. R. Y., along with this notice, remarked that the sentence quoted (p. 192.) as "instancing the editor's style of treating his subject," is almost precisely a re-quotation of the extract selected by A. R. Y., p. 57, 58., in his review of the *British Naturalist*. We had overlooked this until it had become too late to remedy it; and can only say, in the sheets submitted for notice, it was not even acknowledged as a quotation, much less acknowledged as derived from the *British Naturalist*. A. R. Y., in conclusion, remarks, "The very nature of the intended *Angler's Museum*, I am aware, not only allows, but demands, the liberty of drawing copiously from the writings of others; but such a passage as I have noticed ought not to have been given without some acknowledgement of the source from which it was derived. This circumstance, however, may perhaps be duly attended to, when the work actually appears before the public eye."

Planària cornùta, described p. 344., is really the Planària *cornùta* of *Müller*, as I have been able to verify by reference to his figure copied into the *Encyclopédie Méthodique*. The Planària vittàta of *Montagu* is probably the same species, as is stated at p. 429.; but, in a manner too decided, because I had not his figure before me. — *G. Johnston. Berwick upon Tweed, July* 15. 1832.

ART. II. *Queries and Answers.*

THE Vampire Bat. — Bishop Heber's opinion (p. 470.) of the innocence of this creature by no means agrees with what one has read of his blood-thirsty habits; and particularly the instances given by Captain Stedman, in his *Travels in Surinam*, who, more than once, individually, experienced the inconvenience of the Sangrado system of blood-letting, or, more properly, blood-taking, pursued by this practitioner. — *S. T. Stoke Ferry, June* 8. 1832.

The Vampire. —

> "Non missura cutem, nisi plena cruoris hirudo." *Hor.*
>
> "This leech will suck the vein, until
> From your heart's blood he gets his fill."

In answer to the query of J. D. (p. 471.), "whether the vampire of India and that of South America be of one species," I beg to say that I consider them distinct species. I have never yet seen a bat from India with a membrane rising perpendicularly from the end of its nose; nor have I ever been able to learn that bats in India suck animals, though I have questioned many people on this subject. I could only find two species of bats in Guiana with a membrane rising from the nose. Both these kinds suck animals and eat fruit; while those bats without a membrane on the nose seem to live entirely upon fruit and insects, but chiefly insects. A gentleman, by name Walcott, from Barbadoes, lived high up the River Demerara. While I was passing a day or two at his house, the vampires sucked his son, a boy of about ten or eleven years old, some of his fowls, and his jackass. The youth showed me his forehead at daybreak: the wound was still bleeding apace, and I examined it with minute attention. The poor ass was doomed to be a prey to these sanguinary imps of night; he looked like misery steeped in vinegar. I saw, by the numerous sores on his body, and by his apparent debility, that he would soon sink under his afflictions. Mr. Walcott told me that it was with the greatest difficulty he could keep a few fowls, on account of the smaller vampire; and that the larger kind were killing his poor ass by inches. It was the only quadruped he had brought up with him into the forest.

Although I was so long in Dutch Guiana, and visited the Orinoco and Cayenne, and ranged through part of the interior of Portuguese Guiana, still I could never find out how the vampires actually draw the blood; and, at this day, I am as ignorant of the real process as though I had never been in the vampire's country. I should not feel so mortified at my total failure in attempting the discovery, had I not made such diligent search after the vampire, and examined its haunts. Europeans may consider as fabulous the stories related of the vampire; but, for my own part, I must believe in its powers of sucking blood from living animals, as I have repeatedly seen both men and beasts which had been sucked, and, moreover, I have examined very minutely their bleeding wounds.

Wishful of having it in my power to say that I had been sucked by the vampire, and not caring for the loss of ten or twelve ounces of blood, I frequently and designedly put myself in the way of trial. But the vampire seemed to take a personal dislike to me; and the provoking brute would refuse to give my claret one solitary trial, though he would tap the more favoured Indian's toe, in a hammock within a few yards of mine. For the space of eleven months, I slept alone in the loft of a woodcutter's abandoned house in the forest; and though the vampire came in and out every night, and I had the finest opportunity of seeing him, as the moon shone through apertures where windows had once been, I never could be certain that I saw him make a positive attempt to quench his thirst from my veins, though he often hovered over the hammock. — *Charles Waterton. Walton Hall, June* 11. 1832.

The Wigeon's Nest and Eggs found by J. C. (p. 384.) — In addition to the query by Mr. Waterton, p. 590., on this subject, I am desirous to learn if J. C. recollects the colour and size of the eggs he found, and what their size and colour were. — *J. D. Salmon. Bourne, Lincolnshire, July* 9. 1832.

Lampreys, their Sex, Mode of Spawning, &c. (Vol. III. p. 478., Vol. V. 23. 290.) — Sir, When I had the pleasure of writing to you before (Vol. V. p. 290.), I had either overlooked or forgotten the queries of "An Old Angler," respecting the lamprey (Vol. III. p. 478.), or I should have replied to them at that time. However, your remarks in the April Number (p. 290.) have induced me to pay a little more attention to the subject. I can now confirm, in the strongest and most satisfactory manner, the supposition of An Old Angler, that the sexes are as distinct in the lamprey as they are in the cod or the herring. How so distinguished an anatomist as Sir E. Home fell into such a mistake it is not for me to say: but I am as certain that the sexes are distinct in the lamprey, as that they are so in any other animal; and I will now give my reason for making this positive assertion. On the 8th of May, happening to cross a small stream, I saw a number of lampreys in the act of spawning; and, remembering the queries of your correspondent, I stood to watch their motions. After observing them for some time, I observed one twist its tail round another in such a manner, and they both stirred up the sand and small gravel from the bottom in such a way, as convinced me it was a conjunction of the sexes. However, there were so many of them together, and they kept so continually moving about, that I could not single out the two individuals, and thus ascertain whether they were male and female: but I felt so desirous of being able to set this question at rest, that I went again next morning, and was fortunate enough to find only two, a male and a female. I then witnessed several sexual conjunctions, during which the sand and small gravel was stirred up with them, and each of which was followed by the ejection of a jet of eggs from the female. I then caught them both, and dissected them: the sexual organ in the male was projected above a quarter of an inch, and the body filled with milt; the female, although she seemed to have already shed a considerable quantity of her spawn, had still a tolerable stock remaining. I frequently afterwards witnessed the same thing, and always found the same difference of sexes; in fact, there was generally no difficulty in distinguishing this difference: without taking them out of the water, the female might readily be known by the enlargement of her body, and the male by still more incontestable tokens.

I have been induced to describe this more minutely than I otherwise should have done, in consequence of the mystery in which the propagation of fish has been hitherto wrapped; and I am not aware that what I have here described has been witnessed by any one before; at least, I do not know that it has been recorded.

I caught half a dozen lampreys, four males and two females, and preserved them in spirits; and these I now forward to you.

Concerning the large lamprey, I am unable to give the same information, having never seen it in the act of spawning; but I have repeatedly caught both milters and spawners of this species, with the milt and roe as distinctly visible in them as it is in the salmon or any other fish.

I am of opinion that the P. fluviátilis and the P. marìnus are distinct species, for the following reasons: — 1st, Because the former stays with us the whole year, whilst the latter only ascends the rivers to spawn, and then immediately returns to the sea; 2d, Because fish which are in the habit of descending to the sea never (unless the small lamprey be an exception to the general rule) arrive at maturity until they have visited it; and, 3dly, Because there are no intermediate sizes (at least in the Ribble) between the one which, although only 6 in. or 7 in. long, and half an ounce in weight, is yet capable of propagation, and the one of a pound weight. Not having one of the larger kind to refer to, I am unable to point out any specific difference of form. — *T. G. Clitheroe, Lancashire, May* 2. 1832.

The specimens sent are, as described, four males and two females, of the Petromỳzon fluviátilis of *Linnæus*, called by the Thames fishermen the lampern, to distinguish it from the P. marìnus *Lin.*, which they call the lamprey. It seems desirable here, to add what has been recorded elsewhere, by late observers, on the subject of the distinction of the sexes in the lamprey and lampern; since Baron Cuvier, in the first volume of the *Histoire Naturelle des Poissons*, 1828, p. 534., depending on the observations of others, repeats the statement of the hermaphroditism of the eel and the lamprey, and appears to consider the occurrence of a single male lamprey, noticed by MM. Magendie and Desmoulins, as accidental.

In the 45th volume of Constable's *Miscellany*, devoted to a reprint of White's *History of Selborne*, Sir Wm. Jardine, the editor, among other valuable additions appended as notes, has the following, at the foot of p. 66.: —

"The manner in which the common lamprey (Petromỳzon marìnus), and the lesser species commonly known as lamperns, form their spawning beds, is curious. They ascend our rivers to breed about the end of June, and remain until the beginning of August. They are not furnished with any elongation of jaw, afforded to most of our freshwater fish, to form the receiving furrows in this important season; but the want is supplied by their sucker-like mouth, by which they individually remove each stone. Their power is immense. Stones of a very large size are transported, and a large furrow is soon formed. The P. marinus remain in pairs, two on each spawning place; and, while there employed, retain themselves affixed by the mouths to a large stone. The P. fluviátilis, and another small species which I have not determined, are gregarious, acting in concert, and forming, in the same manner, a general spawning bed." — *W. J.*

Additional evidence on the same subject, and referring to both species, occurs at p. 133. of the *Reports of Proceedings of the Committee of Science and Correspondence of the Zoological Society of London*, Part I., 1830–1831.

Evening Meeting, Sept. 27. 1831. " Mr. Yarrell exhibited preparations of the two sexes distinct both in the lamprey and lampern, at the time they were about to deposit their ova and milt; and gave the following account of his investigation of this subject: —

" The common river lampern (Petromýzon fluviátilis *L.*) was obtained and examined every week from March to the middle of May. Up to the 19th of April, more females than males were taken; but after this period, the females being nearly ready to deposit their roe, the males were most numerous, in the proportion of two to one. All the females taken about the 26th of April were in a state to deposit their roe; and the milt of the males, now become fluid, passed in a stream from the sheath behind the anal aperture, on making slight pressure upon the abdomen. By the 10th of May nearly the whole of those examined had deposited their spawn. The males were entirely void of any appearance of milt, and the females at this time might be mistaken for males that had not spawned. The gelatinous matrix of the ova appeared swollen, and of large size; and close examination showed the ruptured membrane and extravasated blood produced by the separation of the ova, with here and there an occasional ovum still adhering. The kidneys (which have been mistaken for the male sexual organs) were not observed to undergo any alteration, either in size or appearance, during a long series of examinations. The males could be distinguished from the females, externally, by their larger respiratory apparatus and lips.

" Seven examples of the lamprey (P. marinus *L.*) were received on the 3d of May from the Severn, about which time they ascend that river for the purpose of spawning. Of these seven, four were males and three females: the appearance of milt and ova being most distinct. The kidneys, lying in the cavity of the abdomen, were of equal size in both sexes, elongated and narrow in form, with the ureter running the whole length of the outer edge. The anal opening is situated anterior to a small sheath, which, when slit up, exposes four apertures, the two innermost of which lead to the ureters; the outer two open into the abdominal cavity." — *S. T. P. July* 9. 1832.

Notes on the Spawning of the Minnow (*Cýprinus Phóxinus* L.). — As I have been so successful in my observations of the lamprey, I felt desirous of ascertaining whether the same thing could be seen in other fish (as, in natural history, it is by no means safe to reason from analogy); and as there was a large shoal of minnows spawning near the place where I had seen the lampreys, I determined to watch their motions. They happened to have chosen a very convenient situation for being observed, being between two large stones in the river, which lay about 3 ft. from each other; so that, by cautiously approaching them from behind one of the stones, I got close to them without disturbing them. But after watching them carefully and repeatedly within the distance of 2 ft., I can only speak doubtfully of their operations; for they were so numerous, and incessant in their motions, and, when a female was about to shed her spawn, the males (which were ten times as numerous as the females) crowded round her in such a manner as to render it very difficult, if not impossible, to speak with certainty on the subject. I will state what steps I took to satisfy myself; and, perhaps, the history of my failure may be of use to future observers.

It occurred to me, from what I observed, that it was probable the males had the power of absorbing the eggs after exclusion, and impregnating them within their own bodies: and I caught a dozen males at different times when they were attending on the female, and opened them, but I could discover nothing like an egg. I then caught a female, and scattered the spawn (which was expelled by the slightest pressure) in a place frequented by a number of males, but they took no notice of it whatever. I after this caught a female when she was surrounded by a number of males, and apparently in the act of shedding her spawn, and examined whether the spawn which I pressed from her body was impregnated; but it appeared perfectly homogeneous, and so delicate in its texture, that it burst with the slightest touch; whilst in that which I picked up from among the gravel, where it was scattered abundantly, the impregnation was visible with the assistance of the microscope; and it was so much tougher in its covering, as to bear rolling about in my hand without injury.

I then tried to impregnate the eggs *mechanically*, and applied a drop of the spermatic fluid to the egg at the moment of exclusion; and it certainly appeared to me, in one instance, both to increase the size, and alter the colour, of the eggs it was applied to: but I was not able to produce the same effect so decidedly in any of my subsequent attempts to do so.

My observations, which were often repeated, induce me to believe that the egg is impregnated at the moment of exclusion; and that two males have (almost invariably) access to the female at the same time; for I frequently remarked, that, when a female came among a number of males, they immediately pursued her: if she was not ready for shedding her spawn, she made a very precipitate retreat; but, if she was, she came boldly in among them, and was immediately pressed closely by a male on each side; and, when they had been in that situation a short time, were superseded by other two, who wedged themselves in between them and the female, who appeared to treat all her lovers with the same kindness.

One difficulty is, that the spermatic fluid mixes very readily with water; and I cannot imagine how its virtue is preserved*, if (as I suppose may be the case) the egg is impregnated after exclusion: but I also think it probable that the ventral fins of the female serve to conduct this fluid to the place where it is needed; and the chemical affinity between it and the egg may be sufficient to account for the impregnation.

(*P.S. July 27th.* I tried to hatch some of the eggs which I had endeavoured to fecundate. The attempt was unsuccessful. I placed the eggs (which I had put into some clean washed gravel in a shallow vessel, open at the top, and with holes drilled through the sides) in a small stream of water; but I found, to my great mortification, on looking for them a day or two after, that there was not one left, but that in their stead were many aquatic insects, which had, no doubt, feasted on them as long as they lasted; and after this I was not able to meet with another shoal of minnows in the act of spawning. — *T. G.*)

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* It appears to be a beautiful provision of nature that mixture with water should increase the sphere of its action. Spallanzani found by actual experiment that three grains of the seed of a male frog might be diluted with a pint of water, without destroying its stimulating power.

For an interesting series of experiments on this subject, see his *Dissertations*, vol. ii. p. 142. chap. 3. — *S. T. P. July* 9. 1832.

The head of the minnow, in the spawning season, is spotted over with small white knobs, apparently osseous in their structure, which make their appearance immediately before they begin to spawn, and which disappear again as shortly after; and I think they are intended as a protection to the head of the fish during the spawning, as I remarked that they generally thrust their heads in between two pebbles, and had their tails sticking up almost perpendicularly. Yet this was not always the case, as they sometimes ran nearly out of the water; and it was in this situation that I observed what I have before mentioned, as I found it impossible to discover any thing that was done by those in deeper water; for, when a female went into such a situation, there was such a crowd of males rushed to the place, that I lost sight of her in a moment.

I was astonished to find how quickly the eggs were hatched. I discovered a large shoal spawning on the 11th of May; on the 12th, they were diminished to one tenth of the number; and on the 14th (the 13th was Sunday), there was not one left. As I had by no means satisfied myself on the subject, I felt disappointed that they had so soon finished their operations; and I took up a handful of the gravel where they had been spawning, and examined it with the microscope, to see whether I could discover any eggs, and how they were going on; when, to my great surprise, I found them hatching, and some of them already excluded from the egg. One of them, which I took on the point of a knife, swam briskly away; and another was the means of pointing out an enemy to me that I had never before suspected, and that I had always believed to be the prey and not the devourer of fish. The poor minnow had somehow got fast to the point of the knife; and, in its struggles to free itself, it attracted the attention of a creeper (the larva, I believe, of the fly called the green drake by anglers), which pounced upon it as fiercely as the water staphylinus does upon the luckless tadpole: but, fortunately for the minnow, either the glittering of the knife-blade, or the motion of my hand, scared it away again without its prey.

The young minnows in this state were quite transparent, except the eyes, which appeared disproportionately large; and they seemed to be perfectly aware that they owed their safety to concealment, as those that I saw immediately buried themselves in the gravel when they were set at liberty. — *T. G. Clitheroe, Lancashire, May* 2. 1832.

On preserving Insects selected for Cabinets. (p. 495.) — I only know of two methods to guard prepared insects from the depredations of living ones. The first is, by poisoning the atmosphere; the second is, by poisoning the preserved specimens themselves, so effectually, that they are no longer food for the depredator. But there are some objections to both these modes. A poisoned atmosphere will evaporate in time, if not attended to, or if neglected to be renewed; and there is great difficulty in poisoning some specimens, on account of their delicacy and minuteness. If you keep spirits of turpentine in the boxes which contain your preserved specimens, I am of opinion that those specimens will be safe as long as the odour of turpentine remains in the box; for it is said to be the most pernicious of all scents to insects. But it requires attention to keep up an atmosphere of spirit of turpentine. If it be allowed to evaporate entirely, then there is a clear and undisputed path open to the inroads of the enemy: he will take advantage of your absence or neglect; and, when you return to view your treasure you will find it in ruins. Spirits of turpentine, poured into a common glass inkstand in which there is a piece of sponge, and placed in a corner of your box, will create a poisoned atmosphere, and kill every insect there. The poisoning of your specimens by means of corrosive sublimate in alcohol is a most effectual method. As soon as the operation is properly performed, the depredating insect perceives that the prepared specimen is no longer food for it, and will for ever cease to attack it. But, then, every part must have received the poison; otherwise those parts where the poison has not reached will still be exposed to the enemy; and he will pass unhurt over the poisoned parts, till he arrive at that part of your specimen which is still wholesome food for him. Now, the difficulty lies in applying the solution to very minute specimens, without injuring their appearance; and all that can be said is, to recommend unwearied exertion, which is sure to be attended with great skill; and great skill will insure surprising success. I myself have attended to the preservation of insects with the assiduity which Horace recommends to poets: — "Nocturnâ versate manu, versate diurnâ." The result has been astonishing success, and a perfect conviction that there is no absolute and lasting safety for prepared specimens, in zoology, from the depredations of insects, except by poisoning every part of them with a solution of corrosive sublimate in alcohol. I put a good large teaspoonful of well pounded corrosive sublimate into a wine bottle full of alcohol. I let it stand over night, and the next morning draw it off into a clean bottle. When I apply it to black substances, and perceive that it leaves little white particles on them, I then make it weaker by adding alcohol. A black feather, dipped into the solution, and then dried, will be a very good test of the state of the solution. If it be too strong, it will leave a whiteness upon the feather.

A preparation of arsenic is frequently used; but it is very dangerous, and sometimes attended with lamentable consequences. I knew a naturalist, by name Howe, in Cayenne, in French Guiana, who had lost sixteen of his teeth. He kept them in a box, and showed them to me. On opening the lid — "These fine teeth," said he, "once belonged to my jaws: they all dropped out by my making use of the *savon arsenetique* for preserving the skins of animals." I take this opportunity of remarking that it is my firm conviction, that the *arsenetical soap* can never be used with any success, if you wish to restore the true form and figure to a skin.

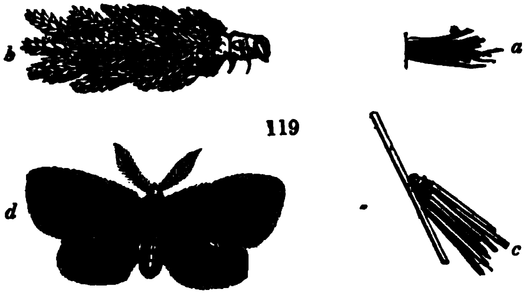
I fear that your correspondent may make use of tight boxes and aromatic atmospheres, and still, in the end, not be completely successful in preserving his specimens from the depredation of insects. The tight box and aromatic atmosphere will certainly do a great deal for him; but they are liable to fail, for this obvious reason, viz. that they do not render, for ever, absolutely baneful and abhorrent to the depredator, that which in itself is nutritious and grateful to him. In an evil hour, through neglect in keeping up a poisoned atmosphere, the specimens collected by your correspondent's industry, and prepared by his art, and which ought to live, as it were, for the admiration of future ages, may fall a prey to an intruding and almost invisible enemy: so that, unless he apply the solution of corrosive sublimate in alcohol, he is never perfectly safe from a surprise. I have tried a decoction of aloes, wormwood, and walnut leaves, thinking they would be of service, on account of their bitterness: the trial completely failed. Wherefore, in conclusion, I venture to recommend to your correspondent not to put much trust in simples.

"Contra vim mortis, non est medicamen in hortis."

"Against the deadly moth, can I,
From herbs, no remedy supply."

— *Charles Waterton. Walton Hall, June* 9. 1832.

The Tail of the Caterpillar becomes the Head of the Butterfly (p. 206. 398.). — Sir, The caterpillar of the genus *Psy̆che*, figured by Mr. Curtis, in his *British Entomology* (pl. 332.), is enclosed in a case, and is frequently to be seen on trunks of trees, and on rocks, where it changes to a pupa. The head part is fastened to the tree or rock, but the moth escapes at the opposite or tail part; but whether it backs out, or acts the part of the lady's pony, as facetiously adverted to in p. 398., I have not discovered, and have therefore enclosed you a specimen (*fig.* 119. *a*) of the pupa, with the exuviæ at the opposite end to that by which the pupa is fastened. I suspect that the circumstances are the same with the pupæ of some *Tineæ*, of Oikéticos of Guilding, in *Lin. Trans.* (vol. xv. tab. 6.), and with the Penthóphera? mentioned at p. 252. of your current volume. One of my larvæ of Penthóphera? in the case, as spoken of in your p. 252., lies motionless, and, I suspect, is in pupa (I send you a sketch of its present appearance, *b*); the other began to move early in the spring, and is now a larva on a sprig of birch: but I could not see that it had eaten (since it ceased eating in the autumn) until lately, when it ate a very little. Two or three specimens of the pupa (*b*) of this insect were found, last autumn, near Heron Court, Hants, and given to Mr. Curtis, by the Honourable C. A. Harris. I am, Sir, yours, &c.—*J. C. Dale. May*, 1832.



Mr. Dale's favour was received through the hands of Mr. Curtis, who obligingly stated that the pupa case sent by Mr. Dale, and represented in our figure (*a*), assimilates closely to that of *Psýche* nitidélla of *Hübner*, which Mr. Curtis has copied, and incidentally exhibited on his plate 332.; and which we have again copied, from Mr. Curtis's plate, in our figure (*c*). The professed subject of Mr. Curtis's plate 332. is *Psýche* radiélla of Curtis, and his figure of this insect we have copied in our figure (*d*); and Mr. Curtis hints that it is possible that the pupa case sent us by Mr Dale, and represented in our figure (*a*), is the pupa case of this *Psýche* radiélla *Curtis*. The pupa case, of which Mr. Dale sent us a sketch (*b*), Mr. Curtis suspects may be the pupa case of the Penthóphera nígricans of his *British Entomology* (pl. 213.): the case is fabricated mainly of small portions of the branches of the common ling (Callùna vulgaris *Sal.*, *Erìca* vulgàris *L.*) The pupa cases of these two insects (*Psýche* radiélla *Curtis*, and Penthóphera nígricans) have never yet been figured, or to a certainty met with: we hope, therefore, should the pupa cases represented in our figures (*a* and *b*) develope these insects, Mr. Dale will be so obliging as to tell us so; or, if they develope insects of other species, as to tell us all he can about them. From the able description and notices supplied by Mr. Curtis, to his figure of *Psýche* radiélla *Curtis*, in his *British Entomology* (pl. 332.), the following remarks, very valuable in themselves, and pertinent to the question at issue, are quoted.—*J. D.*

"Ochsenheimer [a most accurate observer of nature] makes some curious observations respecting our insects: he says the male caterpillar turns round in his case, or sack, before changing to a pupa, in order to be able to creep out at the hinder opening: this becomes necessary, I suppose, from the case being firmly attached by the other end to a leaf or tree. He also says, that virgin females sometimes lay fruitful eggs." "It is a very extraordinary fact, that the group of moths to which *Psy̆che* belongs makes, in more than one respect, a near approach to the Phrygánidæ; and, I think, they will be made eventually to connect the orders of Trichóptera and Lepidóptera; for, whether we consider the larvæ and their remarkable economy, or the form of the perfect insects and the substance with which they are clothed, the resemblance is most striking. It will, however, require considerable additions of the Trichóptera to our cabinets, as well as a better knowledge of the structure of those we already possess, before this change can be safely attempted."

The Tail of the Caterpillar becoming the Head of the Butterfly. (p. 206. 398, 399.) — Sir, Your correspondent T. C. (p. 206.) is most certainly in an error when he states this to be a fact. I know not what species he refers to; but, whatever it may be, such a change is hardly possible. The Vanéssa genus, when full fed, spin a kind of silk button, as shown in *Insect Transformations* (p. 274.), to which the caterpillar fixes itself by the tail, and hangs with the head downwards, generally a day, and sometimes nearly two days, before the change to the chrysalis takes place. The skin begins to split at the lower end, or head of the caterpillar, where the head of the chrysalis is first developed, and, by degrees, is worked upwards, till it is entirely disengaged at the tail end. The chrysalis then fixes its tail to the silk button, and hangs securely till the fly is bred, which is in about fourteen or sixteen days, if the weather proves warm. The outline of the wings and antennæ may be easily distinguished in the chrysalis; and, a day or two before the butterfly appears, the colours of its wings may be seen through the thin shell, showing that the head of the insect continues in the same position. When the fly bursts from the chrysalis, it comes out at the bottom, bends itself upwards, and clings by its feet to the chrysalis, drawing out the rest of its body; and now, for the first time, after tying itself up, is the insect in a position with its head uppermost: here it rests till the wings are expanded, which, I have observed in the Vanéssa urticæ, is in about ten or twelve minutes after the fly comes out, though they do not acquire sufficient strength, in that time, to enable the insect to fly, being at first soft and flabby, like wet paper. I have bred numbers of the peacock and small tortoiseshell butterflies, but in no instance could I discover the tail of the caterpillar changing into the head of the butterfly. I would recommend T. C. to procure some of these caterpillars, which he will doubtless find plentiful on the great stinging nettle (*Ur*tica dioíca *Lin.*), in July, and put them in a breeding-cage, with some of their favourite food: he will then have an opportunity of observing correctly the manner in which they change: and that it is not the tail of the caterpillar which becomes the head of the butterfly. — *T. G. Chipping Norton, Oxfordshire, May* 15. 1832.

An English Work descriptive of the Species of British Insects wanted. — Sir, Is there any moderately priced book on British Entomology, by which I may learn to affix to my specimens their proper scientific names? I am aware there are many such in Botany, and can hardly suppose there are none such in Entomology. The publications of Curtis and of Stephens, though affording the information I want, are too expensive to come within my reach. — *Tyro. March* 24. 1832.

Humming in the Air. (p. 110. 301.) — To O.'s query and suggestions on this subject, I beg to contribute some observations. No one who has resided in the country, or has walked on an open field or common on a calm summer day, but must have been struck with this truly rural sound. The poet Thomson notices it, with his usual elegance and accuracy: —

> "Resounds the living surface of the ground:
> Nor undelightful is the ceaseless hum
> To him who muses through the woods at noon;
> Or drowsy shepherd, as he lies reclined,
> . . . . . . beneath the floating shade
> Of willows grey." *Summer.*

That the vibrations of innumerable wings of insects "resounds" from the surface of the ground, is certainly true; but that the "ceaseless hum" heard in the air proceeds from a numerous congregation of one sort of fly, is equally a fact. Although I have lived by far the greater part of my life in the country, it was a period of many years before I discovered the real cause of this continuous hum in the air. I accustomed myself to attribute it to the sound from the wings of bees, and all other insects passing and repassing near the spot where I stood; till, on one occasion, while I was passing over an open eminence in a well wooded country, this hum was so audible that I thought a swarm of bees was passing over-head: on looking up, I saw no bees, but an innumerable swarm of flies disporting in the sunbeams, at the height of 50 or 60 ft. from the ground. This I afterwards found to be an assembly of the sexes; not so closely thronged together as to be collectively visible, but flying in very open order in all directions, and in most rapid motion; requiring a keen sight to discern them, either collectively or individually. Their height from the ground, and rapidity of flight, are the causes of their eluding the sight of those who know not where to look for the source of this fairy-like sound, but a strong and steady eye will readily detect the humming throng. I paid attention, afterwards, to their movements, and discovered, that, after passing the greater part of the day in the air, they descend to the woods, where they may be both heard and seen, basking on the sunny side of the trunks of trees, just before sunset. It is nearly twice the size of the common house-fly, and exactly of the same form and colour. In autumn it enters houses, and is often found laid up for the winter in the valance of bed and window curtains. — *J. M.*

The Caterpillar of the Broom Moth eats the Petals of Flowers in preference to Herbage. How is it defended from the Spines of Furze, as it is devoid of a hairy Covering like A′rctia Càja, *the Garden Tiger? And is not the Covering of the* Bómbyx Càja *subservient to its Defence?* — Sir, The incidental mention, at p. 68., of the broom moth (Chèsias spartiàta *Stephens*) leads me to communicate the following notice and queries respecting it: —

In 1830, I captured a considerable number of caterpillars of this species on the common furze (*U′*lex europæ′a), when that plant was in full bloom. I remarked nothing singular in their feeding at the time; and took home with me some young furze shoots, without blossoms, for them to eat. I put them, with their food, into a breeding-box; and, after some time, came to see how they were going on, but not a bit had they touched. I thought they might not be quite reconciled to their situation, as they seemed very restless; so I left them to themselves. The next day it was the same. I then sent for some fresh furze; and they brought me some with blossoms, which I placed in the box instead of the other: in a very short time they had eaten every blossom, while the thorny part they had left untouched, as before.

It is well known how wonderfully the larvæ of the common tiger moth (A′rctia *Càja*) are defended against the nettle's sting; but those of the broom moth are, to all outward appearance, entirely unprovided against the dangerous thorns among which they feed. Their skin is like velvet to the touch; but, notwithstanding, I have seen them lean their whole weight on the sharpest point without the least injury. Is it, then, from the elasticity and toughness of the skin that they are thus enabled to make their way through such a "cheval de frise" of thorns? — or have the long hairs nothing to do with defending the body of the tiger moth? If any one of your readers would give me more information on these subjects, I should be much obliged. I am, Sir, yours, &c. — *Bómbyx. Feb.* 3. 1832.

If the caterpillar of the garden tiger be molested when feeding at considerable height from the ground, it makes no scruple, by a vigorous contortion, to release itself from molestation, to throw itself to the earth; perhaps in the consciousness that its long elastic hairs will preserve it from all injury by concussion. It will be scarcely possible to apply to the hairs of this caterpillar the solution that has been, in the *Library of Entertaining Knowledge*, so admirably offered of the utility to the cat of its whiskers. — *J. D.*

A Meteorological Calendar; the best Formulary and Instruments for. — E. H. G. asks for information on these points, and further, asks the names of the makers of, and, if agreeable, their prices for the instruments recommended; cheapness being a consideration. The name and price of "any good and cheap elementary work on the subject" will also be valued.

We leave to our meteorological correspondents the majority of E. H. G.'s queries; but respecting a formulary, we may remark, that the best we have seen is one sent us by our valued correspondent, Sigma, but to whom we have been under the necessity of returning it, as its form was too expensive for being printed, and because we are, for the present at least, scarcely desirous of more meteorological journals. The calendar mentioned was of this form: — A sheet of paper was divided into perpendicular columns, as various in width as the following subjects, with which the columns were respectively and successively headed, required: — 1st column, the month; 2d, the day of the month; 3d, height of the thermometer at night; 4th, height of the thermometer by day; 5th, indications of the barometer; 6th, lunation; 7th, state of wind in the forenoon; 8th, state of wind in the afternoon, and the 9th, 10th, 11th, and 12th were ascribed to atmospheric variations; the 9th column the state of the atmosphere at 8 o'clock in the morning; the 10th, to its state at noon; the 11th, to its state at 8 o'clock in the evening; the 12th, to its state at night; the 13th column, a broad one, contains the prevailing form of clouds; the 14th, a broad column, to the appearance of birds, insects, &c., whether solitary, few, or numerous; 15th, a broad column for first appearance of flowers, and notices of their state, as to whether in bud, in full flower, &c.; 16th and last, a broad column also, for general remarks. By the help of a few abbreviations, this calendar by Sigma was rendered admirably comprehensive, and what excited our preference for it is, that by such a tabular and synoptical exhibition of the details, all of them could be seen in one view, and, as you might desire, either in connection or contrast. The influence of the atmosphere's condition on organised nature is by this mode very intelligibly, and therefore instructively, shown. The only addition which it occurs to us to suggest is, that, as far as ascertainable, the state of the health of the human inhabitants of the neighbourhood should be from time to time stated, as far as the successive states of health might be deemed consequent on atmospheric action (see p. 350.). — The above had been written previously to the third of April (1832), at which date was exhibited, at a meeting of the London Horticultural Society, "a sentinel thermometer, regulated by the expansion of air acting upon a delicate mercurial balance, invented by Mr. John Lindley." This instrument we have not seen, but the present mention of it will supply a clew to any one desirous to learn more about it. — *J. D.*

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OF

NATURAL HISTORY.

NOVEMBER, 1832.

ORIGINAL COMMUNICATIONS.

Art. I. *On some Peculiarities in the Construction of the Nets of the common Garden Spider* (*Epeïra diadèma*). By William Spence, Esq. F.L.S.

Sir,

So much yet remains to be learned relative to the habits and economy of spiders, that I shall not apologise for occupying a few pages of your Magazine with a short account of some peculiarities in the construction of the nets of Epeïra diadèma[*], which have lately fallen under my observation, and which, though of no great importance in themselves, may deserve recording, with a view to render the history of this tribe more complete.

It is well known that these spiders, as well as others of their family, fix their concentric nets in a position more or less vertical, in the middle of a framework of stronger lines, forming an irregular square, or more generally a triangle, the ends of which are fastened to trees or other objects. I have observed, however, in the Giardino Publico at Milan, this summer, several of these nets fixed in a triangular framework, of which the lines were attached to trees in *two* points only, the lower angle of the frame hanging perpendicularly down, without any fixed point of attachment, but terminating in a line often of several feet in length (in one case, full fifteen), having either a dead leaf, a short twig, or piece of bark, or a small bit of gravel, at its lower extremity; and thus forming a pendulum which, by its weight, kept the net in the requisite degree of tension, and, in fact, more conveniently than if it had been fixed, as allowing the net to vibrate more gently to the impulse of any sudden gust of wind; and at the same time the pendulums, giving way to the slightest touch, were not injured by coming into contact with any accidental pedestrian, as I frequently observed. That the due tension of the nets depended on these pendulums, I ascertained by repeated trials; for, on gently detaching the twig, or leaf, or gravel, at the end of the line, the net immediately collapsed, and blew about in all directions, evidently unfitted for its purpose of a snare. [See p. 747.]

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[*] The only two of the spiders in question which, owing to the height of most of the nets, I had an opportunity of examining, seemed to me to be half-grown individuals of E. diadèma; but it is possible that they were a distinct but closely allied species.

These pendulums, when I first observed them, puzzled me a good deal. If the weights had been always simply dead leaves or twigs, I should at once have considered them as accidental, and arising from the spider having attached its third point of support to a dead leaf or twig (on the neighbouring tree); which, afterwards giving way from the force of the wind, hung down; and, from its weight and the length of the attached line forming a sufficient counterpoise to keep the net duly stretched, the spider was either not aware of the change, or was satisfied with the performance of her net in its new position.

It was not, however, so easy to account for the pendulums ballasted by bits of gravel, varying in size from that of a small pea to that of a horsebean, as the first eight or ten of those which I noticed were attached to nets stretched between the stems of lofty trees at the height of 10 ft. or 12 ft. from the ground, the line of the pendulum being 6 ft. to 8 ft. long, and the gravel vibrating backwards and forwards at the height of 3 ft. or 4 ft. from the ground; but, on careful examination of many nets, I at length met with one which seemed to throw light on the difficulty. In this the gravel of the pendulum rested partly on the ground; and hence it might be inferred that the spider, wanting a point of support for the lower end of the triangle enclosing its net, had let itself drop to the ground, and there fixed its line to one of the pieces of gravel, possibly without being aware of its being a movable object; and of which the elevation from the surface seen in other instances, might be owing to the spider having pulled up the main line of her net in the process of strengthening it by new lines running from it to some more elevated part of the tree, which operation would proportionally lift up the pendulum.

These gravel pendulums, therefore, are most probably, as well as those of leaves, &c., to be considered as accidental: but it must be confessed that it is difficult to explain, on this supposition, the height at which the piece of gravel is sometimes suspended; which, in one instance that I observed, was full 6 ft. from the ground, so as to swing clear of my hat as I walked under it; a height considerably more than that to which it seemed to me that any probable tightening of the main line, as supposed above, could have drawn up the gravel; and it therefore may deserve further investigation (which is the main reason why I submit these imperfect notes to the consideration of those of your readers who may have an opportunity of instituting additional enquiries), whether the spider, led by one of those singular variations of instinct of which Huber has made known so many examples in bees, does not *purposely* shorten the line to which the gravel is attached. In one instance which came under my eyes, the spider certainly seemed aware that the lower part of its net was ballasted by the piece of gravel; for, on my pulling at it violently, the spider instantly darted from the centre of the net down the line, and bit off the gravel, which fell to the ground. We are very liable to mistake in attempting to explain the motives of the actions of insects; but, if the reflection had passed in the spider's mind that the gravel was too heavy, and that it must, at all events, be got rid of, it could not have taken a more sudden and effective step than that which it adopted.

While on the subject of the nets of Epeìra diadèma, I must beg to trespass a little longer on your pages, to notice a criticism of Professor Rennie, in his useful *Insect Architecture* (which work I have but lately seen for the first time), on the account which we have given, in our *Introduction to Entomology*, of their general construction.

In these geometric nets, we have said, flies are entrapped on a principle quite different from that on which they are caught in the webs of the common house spider (*A*rànea doméstica), being *entangled* in the thick-woven meshes of the latter, but being, in fact, *gummed* to the concentric circles of the former, by their legs, wings, &c., adhering to the minute and separate drops of a viscid gum, which may be distinctly seen with a microscope to stud these circles like the beads of a necklace; while the straight rays of the net are entirely free from these gummy globules, and quite unadhesive.

On this account Professor Rennie observes as follows: — " The centre of the net is said also to be composed of more viscid materials than its suspensory lines; a circumstance alleged to be proved by the former appearing under the microscope studded with globules of gum.* We have not been able to verify this distinction, having seen the suspensory lines as often studded in this manner as those in the centre." (*Insect Architecture*, p. 360.)

This remark, I confess, I read with no small surprise. Having, in writing an account of these nets for our book, found nothing satisfactory respecting them in former works, I resolved to describe them wholly from my own observations, in which I spent great part of many days, repeatedly watching the whole process of the construction of the net, from the stretching of the first main line to the completion of the last spiral; and it was in the course of these observations that my attention was first directed to the remarkable difference between the lines of the rays and of the circles, depending on the presence of these globules of gum *only* on the latter, which I examined again and again, that I might be sure of being correct in an observation which seemed to have escaped former writers, and which struck me as being very singular in itself, as the spider must either be furnished with two different sets of silk vesicles, one for secreting the ungummed silk of the rays of the net, and the other for the gummed silk of the circles; or, which would be equally curious, it must possess an apparatus destined for studding its ordinary line with drops of gum solely when this line is employed in forming the circles of its net.

With such grounds for inferring the accuracy of my observations, I had little doubt that, if Professor Rennie had been unable to verify them, the fault lay with himself; but, to be quite certain that some optical illusion had not deceived

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" * *Kirby and Spence's Intr.*, vol. i. p. 419." Here Professor Rennie refers to our work as a joint production; but in various other instances he adverts to it, for what reason I know not, as if written by Mr. Kirby alone. I am ignorant on what process of divination Professor Rennie has founded his competency to attribute to each individual author the facts recorded in a joint production, but the result is what might have been expected from such an attempt; a large proportion of the facts and observations thus ascribed by him to my excellent friend and associate having been made and described by me: as, for example (to omit various other instances), the experiment with Epeìra diadèma (*Insect Architecture*, p. 340.); that with the group of gnats' eggs (*Insect Transformations*, p. 74.); the observation as to the destruction of aphides by the larvæ of the Sýrphidæ (*Ibid.*, p. 270.); and the description of the transformation of Chirónomus plumòsus (*Ibid.*, p. 319.): which last I notice for the purpose of observing that Professor Rennie would not have put the query in the note, as to the power of the thorax to repel water, if he had considered for a moment what takes place with a floating needle, which instantly sinks if a drop of water be let fall on it.

me when making these observations twenty years ago, which might possibly now be removed, I seized the first opportunity of reexamining a net of Epeìra diadèma, which presented precisely the appearances which I have described, namely, the rays free from all gum, and not at all adhering to a splinter of wood brought into contact with them; but the concentric circles thickly studded with drops of gum, and adhering so closely to the splinter as to be pulled by it a full inch out of the plane of the net.

Such being the facts, to what are we to attribute Professor Rennie's inability to verify them? I can only conjecture, to the circumstance of his having examined an old net; for in such the gum is partly evaporated by the sun and air, and some of the globules may possibly, in some cases, be transferred by the struggles of the entrapped flies to the rays. But let Professor Rennie examine (as surely he ought to have done) a perfectly *recent* net, or, still better, one in the process of making, before its rays have had all the circles attached to them; and if he (or any of your readers who wishes to judge between us) does not then see as I have seen, and as we have described in our book, I shall, indeed, marvel.

I am, Sir, yours, &c.

Como, *Sept.* 3. 1832. W. SPENCE.

ART. II. *Some Account of the* Lìmax Sowérbyi *of Férussac.* By JOHN DENSON, Jun. A.L.S.

SOME of the Bayswater gardens are rich enough in slugs; and among these are numerous individuals of a species very distinct from any species that inhabits the limited portions of Cambridgeshire and Suffolk with which I happen to be acquainted. By submitting living individuals of this slug to Mr. James de Carle Sowerby (5. Camden Terrace West, Camden Town), I have learned the following facts respecting it. Mr. G. B. Sowerby, being unable to identify it with any species described, sent specimens of it to Paris, where it had not been before seen, and was determined to be an undescribed species. Subsequently, the Baron de Férussac has published a description of it, and named it *Lìmax* Sowérb*ii* [Sowérby*i*] in his *Histoire Naturelle des Mollusques terrestres et fluviatiles.* Mr. Sowerby referred me to his copy of this work, and thence (from the Supplement to the Genus *Lìmax*, p. 96. ζ) the following description is copied: —

> "Limas de Sowerby. *Lìmax* Sowérbii nobis. Pl. VIII. D. figs. 7, 8. Lutescens, fusco tesseratus; capite et tentaculis nigris; clypeo granuloso,

sulco marginali; carina dorsali succinea, valdè notata: lateribus pallidis." This description may be thus translated: — Sowerby's Slug. In colour approaching to yellow, chequered with brown; head and horns black; shield or mantle as if minutely warted, and with a furrow near its margin; the ridge or keel of the back very obvious, and of an amber colour; the sides pale."

"Plate VIII. D," cited by Férussac, appears not to have been yet published; but the accompanying figures (*fig.* 120. *a*, *b*), drawn by Mr. Sowerby from living individuals, well exhibit the animal under two of its forms: *b*, when it has been touched, and has contracted itself; and *a*, when again dilating itself to resume its progress: *b* does not show, I think, so much contraction as the animal presents when in a state of settled repose; and *a* is much too short and stout for the animal when at its greatest extension in the course of uninterrupted travelling.

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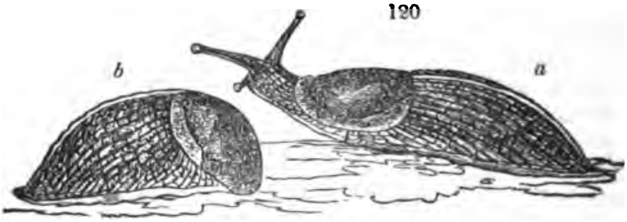

Of the existence of this species at Bayswater, Mr. Sowerby was not previously aware; but mentioned, as additional localities in which it occurs, the neighbourhood of Camden Town and the neighbourhood of Lambeth, and suspects that it is common all round London.

In two of the few Bayswater gardens with which I am acquainted, *Lìmax* Sowérby*i* is most troublesomely abundant; but I cannot state from my own observance that it abounds about Bayswater generally: probably, however, it does. The soil here is a stiffly clayey brown loam incumbent on gravel; and this stiffness of the soil renders it liable to crack during dry and summer weather. The fissures thus formed are a very great convenience to the slugs, which retire into them to escape the annoyance of the drought and the heat; and although they may usually descend not lower than about 3 in., they will sometimes go so deep as 6 in.; they also retreat under large clods; and young ones will hide themselves between the inner surface of flowerpots and the mould they contain. When detected in these places, they exhibit greater contractedness, I think, than shown in *fig.* 120. *b*; and the younger and smaller specimens resemble so many rudely formed dirty-hued boluses, which, as particles of soil and dust are usually adhering, while they are in this state, to their glutinous exterior, fancy may imagine to have been rolled in dust instead of magnesia. The animal in this state is almost as inert as if dead, and a very fit prototype of both sluggard and sluggishness. When, however, the atmosphere changes to a cool or moist state, the species seems soon excited from its hiding places to roam abroad; but, for roaming, prefers the night to the day. I think it is impatient of a superabundance of wet; for, during the late copious rains (Oct. 2—8.), I have found many large specimens adhering to the face of a very dwarf brick wall, immediately in front of which grows an edging of box, which touches and hides the face of the wall, and grows to about the same height. The slugs were in the upper half of this wall, which is about 1 ft. high; and behind the box, and, with swarms of woodlice, seemed to have retreated there to escape the drenchings that have lately been falling.

The idea that snails and slugs are, although lovers of moisture, impatient of much wet, was taught me, perhaps erroneously, in very boyhood; and the argument adduced in support of this opinion was the indisputable fact, that snails, during heavy rains, quit the drenched earth, and mount trees, walls, &c.: it is possible, however, to explain this act of theirs, by assuming that, as all surfaces are then saturated with moisture, which is a great facility to their travelling, they are embracing such favourable opportunities for extending or changing their range of pasture.

Adhering to the face of the wall already named, I found, on Oct. 5., two pairs in tenacious sexual conjunction: their bodies were contracted to about an inch and a half in length (the half of their travelling length), and curved to one side. These, with many additional specimens, I collected on that day, and also then sent to the Rev. L. Jenyns, Swaffham Bulbeck, Cambridgeshire, from whom, I trust, a more scientific account of this species than I am able to give, will be communicated to our readers. The bodies of the specimens then collected felt softer than they usually do, perhaps the effect of the soaking rains; for usually there is a comparative rigidity and leatheriness about the skin of this species, and which, indeed, is so especially tough, that, to crush it when on the ground, unless you would torture the doomed wretch, a vigorous stamp of the foot on a solid spot of earth, is requisite.

Limax Sowérby*i*, when travelling, is really an agreeable object, from its graceful lanceolate figure, neat brown hue, and the straight amber line down its back formed by the dorsal ridge or keel, which is then free from all corrugation. The hinder portion of the body is considerably compressed, and in the young ones so much so, that it is the most striking of their features. A specimen, not of the very largest size, I consider, which I measured a month or so ago, when it was travelling, and at its greatest extension, was nearly three inches long, and of this length the shield or mantle measured three quarters of an inch. The dorsal ridge or keel was straight and unwaved; but when the animal, from being interrupted, contracts itself, this keel or ridge is folded by the contraction into transverse wrinkles. The lateral orifice in the travelling slug was not more than large enough to admit the head of an ordinary pin, into and out of which parasitic mites were nimbly passing. The upper tentacula, or horns, were about four tenths of an inch long, and their tips not abruptly thickened or set on.

To acquire food is, of course, the principal motive for travelling in this species, as in every animal; but I regret my inability to state on what substances it mainly subsists. The imperfect attention my want of time has allowed me to give to it has not discovered to me that it preys much on the growing foliage of plants, although it seems not averse to decaying vegetation. I have found it on partly skeletonised leaves, that had been some time on the ground, of the apple tree, and I thought it was eating away the fleshy part: it will eat off the cuticle of the stems of the potato, when these are beginning to decay in autumn. I think rather it is a foul feeder, eating coarse fare, and not refusing even carrion; for I have known it to feed on potato tubers and thrown away rotten ripe gooseberries, and I have found individuals devouring the dead remains of each other, every part of which they seem to eat, except the skin of the back, and I am not quite certain that they always wait for the *dead remains* of each other. Gardeners accuse them of greedily devouring growing mushrooms raised, as about London they are abundantly, by artificial cultivation. Sometimes a young one will eat its way into a potato, and, having entered, eat away all the interior, and become there much too large to make exit by the hole at which it entered.

Parasitic mites are plentiful on the full-sized individuals of *L*ìmax Sowérby*i*, and I think more plentiful in autumn than in summer, and even in wet weather in autumn; whether of the species Philódromus *L*imàcum *Jenyns*, vol. iv. p. 538., or of a distinct species, I have not the means to determine. I had years ago observed mites running about the bodies of slugs, but was totally ignorant of that information on their person and habits which Mr. Jenyns's figure and lucid description communicate: see vol. iv. p. 538., where the following synonymes seem addible to Philódromus Limàcum. A'carus Limàcum of Linnæus's *Systema Naturæ*, by Gmelin, who (tom. i. pars v. p. 2933., species 73.), under it, says nothing more than this: "Schranck, *Beytr*. 2. *Naturg*., p. 13. *Insect. Aust*., p. 521. No. 1076. Reaum. Act. Paris. 1710. Habitat in Hélice pomàtia." Turton, also, vol. iii. p. 708., seems to render the reference to Schranck of account, by giving this alone, and omits that to Reaumur: his entire account is, "Acarus Limacum found on the Helix pomatia, or snail. Schranck, *Ins. Aust*., p. 521. n. 1076."

Mr. Sowerby also referred me to the following mention of this mite by Férussac:—"Les grosses espèces des genres arions et limas, particulièrement à Paris et aux environs, le variegatus de Draparnaud, qui se tient dans les caves, sont souvent infestés de ce petit acarus que l'on observe sur le collier de limaçons, et dont Réaumur a donné la description et la figure dans les *Mémoires de l'Académie des Sciences* pour l'année 1710. C'est l'Acarus Limacum de Linné. Nous en reparlerons en traitant des limaçons." (*Histoire*, p. 42.) "The large species of the genera Arìon and Lìmax (particularly in Paris and its environs, the *L.* variegàtus of Draparnaud, which confines itself to vaults) are often infested with that small acarus which may be observed on the collar of snails, and of which Reaumur has given a figure and description in the *Mémoires de l'Académie des Sciences* for the year 1710. It is the A'carus Limàcum of Linnæus. We shall speak of it again in treating of snails." This second mention, however, we did not happen to find,

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Hèlix rufèscens (Jeffreys in *Linn. Trans*. vol. xvi. p. 337.) *at Bury St. Edmunds*. — At p. 490. I have stated that the common garden snail, Hèlix aspérsa *Müll*., is, in the old botanic garden at Bury St. Edmunds, in hard winters, numerously destroyed by the common land rat, and have added, "and probably H. híspida of Jeffreys in *Linn. Trans*., also, as a species answering to the characteristics of this abounds." Since this remark was published, I have visited the place and inspected specimens, and find the small species so abounding there to be H. ruféscens. H. híspida (or at least a hispid-shelled species) does also occur at Bury St. Edmunds, but I believe only sparingly: the few specimens I found were among nettles that grew about some of the ruins of the once famous abbey. H. híspida (at least a species with a hispid shell) seems more plentiful about Bayswater. Of both H. ruféscens and H. híspida figures are given in this Magazine: H. ruféscens, Vol. I. p. 427, 428. fig. 184. *y*; H. híspida, Vol. I. p. 427, 428. fig. 184. *a a*. — *J. D.*

REVIEWS.

Art. I. *Catalogue of Works on Natural History, lately published, with some Notice of those considered the most interesting to British Naturalists.*

Kearney, W. H.: Illustrations of the Surrey Zoological Gardens; drawn from Nature on Stone, with Descriptive Notices. 4to. London, 1832. Prints, 3*s.* 6*d.*; Proofs on India paper, 6*s.*

Part I. contains three subjects: — 1. Alpaca, Camèlus *Pàco* L.; 2. The Magot, or Barbary ape, Símia *I'nuus* L., a pair of animals; 3. The Bengal variety of Tiger, *F*èlis *T*ìgris *L.*, a pair of these also. Besides the exhibition, in each print, of its specific subject, the artist has assorted to it a copious supply of harmonising associations, which do credit to his powers of conception and his ability of execution. The attitudes of the animals, too, we deem well chosen. The text, though sketchily, is instructively, written, and reads pleasingly. The book is very eligible for every drawing-room and library.

Slaney, Robert A., Esq. M.P.: An Outline of the Smaller British Birds, intended for the use of Ladies and Young Persons. Foolscap 8vo, 143 pages, and cuts of 12 birds. London, 1832. In green cloth, 4*s.* 6*d.*

A delighting little book, which, in its spirit and its manner, emulates that of the beloved White. Its scope and character will appear from two transcripts which we make. "The author, having often derived pleasure from watching the habits of birds, has thought that a familiar introduction to this branch of natural history may prove useful to ladies and young persons, who were not desirous to enter on scientific descriptions, or to encounter works of greater length." This remark forms a half of the preface, and welcomely evinces that our author is not —

> "A sedentary weaver of long tales."

He is concise, and in a good degree original; but has still a copious sprinkling of select extracts. Our second transcript is of the "Contents." "Winter Visiters, p. 1., Summer Visiters, p. 9., Resident Birds, p. 68., Owls and Hawks,

p. 110., Water Birds, p. 125., Conclusion, p. 142." There are woodcuts of 12 birds in the book, which, but for its price, we would press every ornithologist to possess.

Hewitson, William C.: British Oology; being Illustrations of the Eggs of British Birds, with a Figure of the Egg, or Eggs, of each Species, as far as practicable drawn and coloured from Nature: accompanied by Descriptions of the Materials and Situation of the Nests of the Birds, the Number of Eggs these lay, &c. In 8vo numbers, published every two months, each containing 4 lithographic prints. Newcastle upon Tyne and London. *3s. 6d.*

In September, 1831, we noticed this work in our Vol. IV. p. 429., when the Second Number had just appeared: now, nine Numbers are published, and the work has in no way lessened in the interestingness we then ascribed to it. The author is commendably cautious in advancing only facts derived from the personal observation of himself and friends, or in quoting only the assertions of the most reputable authorities.

Would it not be an excellent means of acquiring a mass of authentic facts on British oology, were the author now to announce that he will publish, at the conclusion of the work, whatever facts, derived from personal observation, his subscribers may please to communicate unexpensively to him, if supplementary, or even controversial, to those already advanced in the work? The probability is, that, by this means, at the expense of only a few sheets of letterpress, some valuable facts might be accumulated and recorded. A correspondent, now at our elbow, says, the author's remarks on the peewit, tab. 1., are excellent: but when it is stated, as two isolated facts, that the bird prefers some slight elevation for the place of its nest; and that it is not to be surprised on the nest, but is ever on the look-out; he says these two facts may be connected, by stating that it prefers slight elevations, to facilitate, and increase the range of, its vigilance; and that, in ploughed land, its nest is never to be found in the furrow, but always on or towards the ridge, where its imperfect nest is not rarely but a hollow within those wreaths of stubble which usually accumulate before the coulter in ploughing, and which, when drawn off by the plough's progress onward, are but very partially covered by the turning furrow slice which follows.

Sharpless, John T., M.D. (of Philadelphia): A Description of the American Wild Swan, proving it to be a New Species, Cýgnus americànus *Sharpless.* Read before the

Academy of Natural Science of Philadelphia, on Feb. 7. 1832. Pamphlet, 8vo, of 8 pages, and 2 lithographic prints.

Dr. Sharpless, in 1831, contributed to the *Cabinet of Natural History and Rural Sports*, published by Messrs. Doughty of Philadelphia, a most delightful article on the wild swan; in which, in a manner almost poetical, he has very happily described the habits of wild swans, and the numerous delighting associations connected with them. In that paper (a sight of which we owe to the kindness of Mr. Yarrell, to whom Dr. Sharpless had sent it) the author intimates his belief that the wild swan of America is in species distinct from the wild swan of Europe. The pamphlet under notice includes the results of Dr. Sharpless's subsequent research on this point of the subject; and in it he presents an abstract of Mr. Yarrell's published descriptions of the *Cýgnus* fèrus *L.* (the Hooper), and the *Cýgnus* Bewíck*ii* Yarrell (Bewick's swan), as well as a short notice of the Trumpeter swan (*Cýgnus* buccinàtor of Dr. Richardson in the *Northern Zoology*), and describes in detail and in contrast the characteristics, both external and internal, of the wild swan of America. The author exhibits a sufficiency of differences, derived from the examination of a series of specimens, to prove it, he conceives, a distinct species, to which he applies the specific epithet "americànus." The detailed differences we cannot transcribe, but the diagnostic presented is this: — "*Cýgnus* americànus [*Sharpless*]. Beak black and semicylindrical, sides of the base with a small orange or yellow spot; body white, tail of twenty feathers, feet black." We commit the matter to the canvass of technical ornithologists.

Anon.: The Entomological Magazine, No. I. Sept. 1832. 8vo, 104 pages. London. *3s. 6d.* To be continued quarterly.

Knowledge is derivable only from the accumulation of observations; and as, in every branch of knowledge, many observers fail to make known their observations for want of a congenial vehicle of publication, we wish there existed a magazine devoted to every branch of knowledge. Possessing this sentiment, we regard with good affection the *Entomological Magazine*, the first number of which is now before us, and which announces that "the plan of the projectors is, to produce a magazine which shall contain illustrations of the habits and metamorphoses of insects, descriptive characters of new genera and species, records of the capture of rarities, reviews (with extracts) of all new entomological works, and information of every kind connected with entomology." Contributions from any authentic sources are solicited, "either in Latin, French, or English;" as, the projectors remark, "it is not our intention to confine ourselves to British entomology, but to embrace the whole circle of the science." Foreign entomologists are requested to communicate their works as soon as published, that British entomologists may as early as possible be made acquainted with their existence, and the nature of their contents. The work is to be published quarterly. No plates are in the first number; but, "should it appear necessary for the elucidation of generic distinctions, plates will be occasionally given, provided the sale of the work at all justify the expense." "The projectors consider themselves as possessing a strong claim on the support of all lovers of entomology, as they have undertaken the work without the slightest expectation of pecuniary advantage, but with a disinterested desire to promote the progress of a science to which they confess themselves zealously attached."

We have looked through this first number with real pleasure; for although not extensively acquainted with species of insects, nor the various systematic combinations of them in which entomologists delight, we are pleased to see provision made for the gratification of those who are. This is done in the following articles: — "Abstract of Straus-Durckheim's 'Considérations Générales sur l'Anatomie comparée des Animaux articulés,' by Edward Doubleday; Monographia Châlcidum, by Francis Walker, Esq. F.L.S; a Description of Two Species of the Genus E'laphrus, lately discovered in Scotland by Charles Lyell, Esq., by John Curtis, Esq. F.L.S.; a Catalogue of a few Insects found in Castle Eden Dean, &c., in 1832, with remarks on some of them, by George Wailes, Esq.; an Entomological Excursion, by Edw. Doubleday and Edward Newman; Monographia *Ægeriàrum* Angliæ, by Edward Newman;" and a Chapter termed "Varieties:" while, for the gratification of less technical lovers of entomology, like ourselves, there are "Some observations on Blight," by Rusticus, written with ability and humour; and a still more delighting article, a conversational one, entitled Colloquia Entomologica, which discusses the question of the relative sufferings of insects as impaled by the collector; claims, for original thinking and acting, the dignified consideration they deserve; and, as a consequence, expatiates with enthusiasm on the delight which would result from exploring the yet unexplored treasures in natural history which transatlantic countries contain. Besides these articles, in the review department six English works are noticed, and three French ones.

The second number of the *Entomological Magazine* is to be published on Jan. 1. 1833.

Brown, Thomas, Captain, F.R.S. L.S. &c.: The Book of Butterflies, Moths, and Sphinxes; with 96 Engravings coloured after Nature. 18mo. 3*s.* 6*d.*; on fine paper, 5*s.*; and in small 8vo, 6*s.*: in cloth. Vol. I. (The work to be completed in two volumes.)

This first volume we have not seen, which forms the 75th of Constable's *Miscellany;* but it is said the engravings alone are cheap at the price of the volume. A correspondent, however, sends us incidentally the following remarks upon it: — "The peacock butterfly is evidently inaccurate in form, the superior and inferior wings bear no natural proportion to each other. The orange tip is given from a foreign specimen: why should this be? It evidently bears but a slight resemblance to the British fly. The large copper butterfly is very inaccurately coloured; and I think it is totally impossible for any one to recognise the cærulean butterfly by the figure given: it is intended for the male, which I find it to resemble but very remotely, on comparison with about fifty specimens now before me; and it has no resemblance whatever to the female. The silver stripe butterfly has the markings of the female, which are very different from those of the male; but its colouring bears no resemblance to that of any of the fritillaries that I have ever seen."

Johnston, George, M.D., Fellow of the Royal College of Surgeons, Edinburgh: A descriptive Catalogue of the recent Zoophytes found on the Coast of North Durham. Read at a Meeting of the Natural History Society of Newcastle upon Tyne, April 16. 1832, and published in their Transactions. Newcastle, 1832. A quarto pamphlet of 38 pages, and 6 plates and 2 woodcuts.

The following extract from the preface will best explain the character of this work, which appears to be not purchasable, except, of course, in the Part of the *Transactions* in which it is included. It "embraces an account of such zoophytes as [says the author], I have found in Berwick Bay, a portion of our coast about 25 miles in extent, bounded by Holy Island on the south, and on the north by the bold promontory of St. Abb's Head. The town of Berwick is situated almost exactly midway between these points, so that my position is very favourable for the investigation of the natural productions of the intermediate shores; and I should not have presumed to lay this Catalogue before the Natural History Society of Northumberland, did I not feel assured that it will be found to contain, not probably a complete, yet such a full list of their zoophytes as will suffice to convey an accurate view of their number and variety; and may be of service to any one who shall in future attempt to illustrate their distribution on the shores of Britain."

"The descriptions of the species have been invariably made from the specimens before me, and in almost every instance without previous reference to the descriptions of others; a circumstance which I have thought it proper to mention, because it may enhance the value of a local catalogue to know to what extent it may be relied on, as affording data to determine how far peculiar situations affect the appearances of species. Several of the descriptions are accompanied by figures, which, in general, illustrate zoophytes either hitherto imperfectly known or not at all."

The descriptions are entirely in English, and are full and clear: the author under some species admits several varieties, and exhibits in some cases quite an array of synonymes; his practical intimacy with these creatures having doubtless led him to guard against the very liable error, a too extensive multiplication of species: 22 genera and 68 species, besides varieties, are described; and it is a pity this valuable contribution to systematic zoology is not separately attainable by all students of zoophytes, to whom it would afford very considerable assistance.

Timbs, John (Editor of "Laconics," "Arcana of Science and Art," &c.): Knowledge for the People, or the Plain Why and Because, in Botany, Mineralogy, Geology, and Meteorology; familiarising subjects of useful Curiosity and amusing Research. 12mo, 284 pages. London, 1832. 4*s.*

There is in this little book, we dare say, the price's worth of information, and so it may be bought for the pockets of youth. We should describe the portion of the book devoted to botany to be a higgledy-piggledy collection of scraps of knowledge compiled from authors of repute, and allocated to respond to questions purposely framed to ask for the information which the extracts or scraps contain. The parts of the book devoted to mineralogy, geology, and meteorology may be better; but of these we are less able to judge. At all events, "the Botany" has given us a prejudice, not soon to be cured, against the "why and because" form of communicating knowledge; it seems but a last means of stringing together things incongruous.

Hooker, W. J., LL.D., and *Greville, R. K.*, LL.D.: Icones Filicum ad eas potissimum Species illustrandas destinatæ quæ hactenus vel in herbariis delituerunt prorsus incognitæ, vel saltem nondum per Icones botanicis innotuerunt: or, Figures and Descriptions of Ferns, principally of such as have been altogether unnoticed by Botanists, or have as yet not been correctly figured. In two vols. folio. London, 1831. With the plates coloured, 24 guineas; with the plates uncoloured, 15*l.*

All of our readers acquainted with ferns, in however few species, are well aware that these plants are distinguished from all others by an interesting peculiarity, beauty, and delicacy of structure, by great diversity and remarkableness in form, and by the varied manner in which their jewel-like masses of capsules are studded over the inferior face of the fronds. These remarks apply, without any qualification, even to the species native to Great Britain; and very gratifying, therefore, it is, to be able to witness in what degree the same interestingness appertains to the species of other countries. To do this the work before us enables all who will consult it, to the extent of 240 exotic species; and these collectively exhibiting, as they belong to many distinct genera, and are natives of various countries, a copious variety of form, of aspect, and of structure. The geographical range of the species depicted will appear from the authors who have contributed to the enrichment of this work by their presents of native specimens, and by their very useful observations. They are, chiefly, Dr. Wallich, of the Calcutta botanic garden; the Rev. Lansdowne Guilding, of St. Vincent; Dr. Bancroft, Mr. Wiles, and Mr. Lunan, of Jamaica; Professor William Jameson, of Quito; Charles Telfair, Esq., and Professor Bojer, of the Mauritius; and the late Mr. Charles Fraser, of New Holland. Opposite the picture of each species is placed the description of it, which is usually of a technical kind, and in Latin, followed by a few general observations in English. Of the superb Alsóphila áspera, a fern attaining the magnitude of a tree, being from 20 to 25 feet high, three plates and a diffuse description are given. To Dr. Wallich the authors declare their very great obligation "for continued supplies of the ferns of the vast continents of India; and these," say they, "have now arrived to so great an extent — and these not alone from Dr. Wallich, but also from Dr. Wight, of Madras — that the authors contemplate, under the sanction and patronage of the Hon. the Board of Directors of the East India Company, to form for them a new and separate publication, under the title of *Filices Asiaticæ Rariores*, to appear on the same size and plan as the *Plantæ Asiaticæ Rariores*."

Wallich, *Nathaniel*, M.D. F.R.S. &c. &c.: Plantæ Rariores Asiaticæ; or, Figures, coloured, and Descriptions, of Two hundred and Ninety-five selected unpublished East Indian Plants. In 3 vols. imperial folio. London, 1832. 36*l.*

This superb work is now complete, and exhibits 295 figures, in which are depicted specimens of as many species of the more ornamental trees, shrubs, and herbaceous plants of India; the specimens being drawn of the natural size, and coloured to nature. This work is really an acquisition to the libraries of Europe; for, while its own magnificence, and the great beauty of the plants selected for its plates, fit it in an especial manner for the drawing-room tables of the wealthy, and supply to the public a means of conceiving of the splendour and loveliness of Indian vegetation, the original descriptions of the plants themselves, and the views of botanical affinity which are exhibited under many of the species, render the work a text book of great value, and indeed indispensable to all who are engaged in the prosecution of scientific botany. This latter high cast of character has arisen from Dr. Wallich having had, in describing the plants, the cooperation of most of the distinguished botanists of Europe, each of whom has described the plants belonging to that class with which he is best acquainted. For so many plants, by researches in all parts of the globe, have now become known, that no botanist can attain to an intimate knowledge of them all; and hence each addicts himself more particularly to the plants of some few classes or orders. We have not space for the names of the many scientific individuals who have thus cooperated in producing this work; but must mention, as of especial value, the following contributions: — A monograph in the second volume, on the *Laúrinæ* of the East Indies, to which there is a supplement in the third volume, both by Professor Nees von Esenbeck: this occupies 22 pages, and developes the most complete account of the order, any where extant; and gives a digest and the characters of the genera and species which range under it. Professor Esenbeck also elaborates, in like manner, in the third volume, the ordinal, generic, and specific characteristics of those lovely plants the Indian *A*canthàceæ; and this valuable contribution to systematic botany occupies 48 pages. Professor Meisner, also in the third volume, presents a synopsis of those plants of the natural order *P*olygòneæ, which belong to British India, so far as specimens of them exist in the vast herbarium which has been collected under the direction of the East India Company, and by them recently, with a munificence highly creditable to the Company, presented to the Linnæan Society of London. In vol. iii. p. 27. Professor Martius, too, elaborates the characters of the Indian Eriocaúleæ and *Xyrídeæ*.

To notice, again, the plates, as these display the very picking of the continent of India, they cannot but be choicely beautiful, or possessed of striking features; as of the latter character we might name, among others, the *Pínus* excélsa, the *Quércus* lamellòsa, and the *Chamæ*'rops Marti*àna.* At the close of the third volume an engraved map of India, occupying two pages, is deemed equivalent to plates of five plants: in this map are marked the routes of the following travellers, by whom the botany of India has been successively explored, although yet but partially: — Mr. Finlayson, Dr. Hamilton, General Hardwicke, M. Leschenault de Latour, Mr. Moorcroft, Mr. Royle, Colonel Sykes, Dr. Wallich, and Dr. Wight. This was a happy thought, and valuable in itself as is a map of India, its value must by this means be much increased to botanical readers. The letterpress part of each volume is given collectively, and precedes the plates.

Lindley, John, F.R.S. &c. &c., Professor of Botany in the University of London: An Introduction to Botany. 8vo, 557 pages, with 6 copperplates and numerous engravings on wood. London, 1832. 18*s.*

This admirable Introduction will, in all probability, henceforth be the text book of all botanists, both incipient and proficient, of Britain, and of very many out of Britain as well. It supplies a greater mass of facts, arguments, inferences, laws, rules, terms, and other technicalities appertaining to the charming science of botany than was ever before procurable in Britain in one volume, and for many times the price. The high professional reputation of its author is a sufficient surety that its pages are occupied by no insignificant and superfluous matter. The only fear will naturally be, that it oversteps the ready apprehension of those unfamiliarised to the use of the technical terms of botany: this fear, we can undertake to say, need not be entertained, for it is the office of an introductory work to explain and exemplify the application of the technical machinery of a science; and all who know Professor Lindley know that no man is more competent, we should say no Englishman is so competent, to perform this task, in relation to botany, in a simple, yet eloquent, perspicuous, and faithful manner.

Smith, Sir *J. E.*, M.D. &c., and *Sowerby*, *James*, F.L.S. &c.: English Botany, or coloured Figures of British Plants, with their essential Characters, Synonymes, and Places of Growth. The Second Edition, arranged according to the Linnæan Method, with the Descriptions shortened, and occasional Remarks added. London. In 8vo numbers, 1*s.* each; monthly, or oftener if desired.

Of this work four numbers are before us. The first three contain five coloured plates each; and the 4th number, three plates and a sheet of letterpress, in which are described all the plants figured in the four numbers: and thus there are presented coloured pictures of 18 plants, and descriptions of them, for 4*s.* Indeed, more than this is done: 27 plants are described, because " the plates are omitted which represent such nearly allied species of plants as may be readily distinguished by the description from those figured." With the merits of the original *English Botany* we have long been acquainted; and it gladdens us to see good impressions from the same well-executed plates coming before the public in so cheap, accessible, and welcome a form. The following are all the particulars in which this second edition differs from the first: — The plates (most of which will be those employed for the first edition) will be printed on smaller paper, and the colouring less highly finished, and such plates omitted as represent those nearly allied species of plants which may be readily distinguished from those figured by the descriptions. Still, that those who purchase this second edition may be supplied with a figure of every species of plant described in it, should they desire it, Mr. Sowerby proposes to sell separately, at 3*d.* each, figures of those species which, although described in this second edition, it does not form part of his plan to include figures of also. The plates and descriptions are published according to the Linnæan system; and, although the descriptions are much condensed, the editor states, " he will endeavour to give all the information contained in the large edition, without repeating in the descriptions those characters which are readily manifested in the plates." To each genus, too, the editor adds the natural order to which it belongs, and a few general remarks on the habits and properties of the species of the genus. A few indispensable alterations in nomenclature are to be made, and the names of the plants are engraved on the plates.

We sincerely concur in the hope of the editor and proprietor, Mr. Sowerby, " that the many intelligent persons whose means are limited may be induced, by the low price at which this edition of *English Botany* is published, to avail themselves of the opportunity of studying the beauties of Flora disclosed around them." It is supposed that about 1200 plates will contain the flowering plants, which may be bound in six volumes; and, as most of them are ready, no delay is likely to occur.

Since the sending of the above notice to press, the fifth number has reached us, which contains a figure of each of the following species: — *Verónica* polìta, arvénsis, *h*ederifòlia, triphýllos, and vérna.

Anon.: British Flowering Plants, drawn from Nature, and engraved under the direction of William Baxter, A.L.S. F.H.S. &c. Curator of the Oxford Botanic Garden. In 8vo Numbers, each containing 4 Plates and descriptive letterpress. Oxford and London. With the Plates coloured, 1*s.*; uncoloured, 6*d.*

This work, added to the one of which we have just spoken, cheeringly evinces that facilities for the extension of botanical knowledge are increasing in number. The present work is to "be confined to a single specimen of each genus of British flowering plants, which will be sufficient for all general purposes." In the two numbers published the following are the plants figured and described: — 1. Fritillària meleàgris; 2. *Tùlipa* sylvéstris; 3. *G*èum rivàle; 4. *V*iola canina; 5. *P*olýgonum Bistórta; 6. Pàris quadrifòlia; 7. Adòni*s* autumnàlis; 8. *O*'phrys apífera. The engravings, especially the first six, are admirable likenesses of the plants; but we think the colouring of 4, 7, and 8, not apt to that of nature. In the descriptive portion to each species are given the systematic and English names, the Linnæan class and order, the natural order, the generic and specific characters, "references to the most popular botanical works," etymons of the generic and specific names, a copious supply of local habitats, a technical description in detail, and on the plate dissections of those parts of the fructification which characterise the genus: these last are explained in the text. Should the plant be applied to any economical purpose, a notice of this fact is also added.

Mackay, James Townsend, M.R.I.A. A.L.S. &c. &c.: A Catalogue of the Phænogamous Plants and Ferns found in Ireland, with Descriptions of some of the rarer Sorts. 4to, 98 pages. Dublin, 1825.

This book is a serviceable guide to the collector of Irish plants, from the indications of habitats which it presents; and the original descriptions, although not numerous, are useful.

Since the publication of this book, Mr. Mackay has discovered additional genera and species, some of which he names in an interesting communication, which he has contributed to the *Gardener's Magazine*, vol. vii. p. 230.

De la Beche, *Henry*, F.R.S. &c.: A Geological Manual. London. Treuttel and Würtz.

Dr. Johnson defines a manual to be "a small book, such as may be carried by the hand." The French have more enlarged ideas of a manual: the *Manuel de Tournure*, for the use of amateur turners, consists of two volumes in folio, which would require the hand of a Cyclops to carry it. From the price of the *Geological Manual*, which is eighteen shillings! we fully expected to see a manual on the French scale, a goodly octavo at least; in this we were disappointed: the book is a comely well printed duodecimo.

The first part of the work is devoted to subjects which may be regarded as pertaining more strictly to physical geography than to geology: but as these sciences are intimately connected, we are not inclined to object to this division of the work, except that it is rather out of proportion to the other parts of the volume: it is chiefly compiled from the first volume of Daubuisson's *Géognosie*. The principal heads are on the temperature of the earth and of springs, the sea and lakes, the temperature of the atmosphere, the action of the sea on coasts, and on currents and tides. These, with some minor articles, carry the reader to p. 103. Of the remaining 400 pages that are, strictly speaking, confined to geology, nearly one third are filled with catalogues of fossil organic remains, chiefly reprinted from catalogues which have appeared in different numbers of the *Philosophical Magazine*. The work is professedly written for the service of the geological student; but he may justly complain that so large a part of it consists of a dry catalogue of shells, which can be of little value, unless he have some well arranged collection to consult, and such collections are extremely rare in this country. Indeed, a numerous catalogue of fossils, for the most part without comment or illustration, is more likely to bewilder the student, and disgust him with the science, than to lend him any aid in his enquiries. What is wanted by those who commence the study of geology is, a selection of the most important organic remains, whether in the animal or vegetable kingdoms, that have been well ascertained to characterise certain formations or series of strata, viz., that do not appear in the strata above or below the series: such characteristic shells in each formation are not numerous, but well deserve the careful attention of the young geologist. Those fossil organic remains that mark a change in the condition of the surface of our planet, as from sea to fresh water, or from fresh water to dry land, are particularly deserving of notice, and also the new forms of organic life which indicate a great change in the character of the ancient inhabitants of the globe; but it can be of little interest to the student to know the names of 300 species or varieties of marine shells, no way remarkable for their structure, occurring in a formation universally admitted to be marine. Correct lists of the fossils in any one formation, made by residents in different districts, like those of Mr. Mantell of the chalk fossils in Sussex, and Mr. Phillips of the chalk fossils in the eastern part of Yorkshire, are extremely interesting to well instructed geologists, who can appreciate their value, and the bearings of the evidence which they furnish; but such lists are not suited for an introductory work, much less so are lists collected from various authors, many of whom have never themselves examined the beds from which the fossils were taken.

Section the third contains an account of what is somewhat quaintly styled the *erratic block group;* which comprises the loose blocks of rock and beds of gravel, scattered over various countries, the evident proofs of the transporting power of water. In this section is comprised also some account of bone caverns and osseous breccia. At section 4. commences the account of the tertiary strata, or what the author is pleased to style "the supercretaceous group." We greatly object to the introduction of new names, in a science already overburdened with different nomenclatures. The term supercretaceous has no advantage over the received term *tertiary*, which is always understood to designate the deposits of strata more recent than chalk; but these strata do not universally rest on chalk, as the term supercretaceous would imply. The tertiary strata are in many respects highly interesting to the geologist, but contain few substances of value to a nation. In the present work they cover 73 pages, while the coal measures, of great geological interest, and possessing the great sources of national wealth, coal and ironstone, are dismissed in a few leaves, and these chiefly occupied with the mountain limestone (the transition limestone of foreign geologists), which the author associates with the coal measures. The chalk and oolite formations, including the Weald clay and sandstone, occupy 122 pages. The red sandstone group is described in 22 pages: this we consider as the best digested and arranged section in the book. The rocks denominated by other geologists primary, are described in a very brief and summary manner; and metallic veins and repositories, so interesting to the geologist, and important to civilised society from their products, occupy less than 4 pages. The author has loitered so long among the shells in the upper strata, that he appears panting to arrive at the end of his journey, and hurries through some of the most valuable parts of the science: like Shakspeare in *Hamlet*, he kills off his principal characters in one short scene, to arrive at a conclusion. Every reader acquainted with geology will agree with us, that there is an extreme disproportion between the relative value of the different subjects, and the space they occupy in this volume. The author has bestowed much diligence in collecting facts from foreign journals respecting the secondary and tertiary strata, but they are not arranged in such a manner as to give the most essential parts of his subject a sufficiently prominent place; so that the geological student, for whose use the work is professedly written, will frequently find himself bewildered among the details of facts, fossils, and opinions.

To the experienced geologist, who has not the opportunity of consulting foreign journals, the *Geological Manual* may serve as a useful book of reference, and save him much trouble when wanting information respecting the progress of geology on the continent of Europe. From an objection to crowding a work like the present with catalogues of shells, it may be believed that we are disposed to undervalue the study of fossil organic remains; but this is not the case: we consider that a cheap manual on fossil remains is at present much wanted by the geological student. A work like this would require great judgment in the selection, and should contain a clear and brief description, with a figure, of the most characteristic species in each formation; and also of others which, though not so characteristic, are the most abundant: it should commence with the lowest beds, and describe the fossils in an ascending series, that the student might mark when particular forms of organic life first appear. The species figured and described should not be too numerous, that the whole might be contained in a cheap pocket volume. If Mr. Lonsdale, or some competent fossilist, would execute well a work of this kind, he would, to borrow the words of our author, "render good service to geology."

In the *Bulletin de la Société Géologique de France*, vol. ii. p. 355., is the following notice of the second edition of Mr. De la Beche's *Manual of Geology*, by M. Boué, foreign secretary, delivered by him to the Society: —

"He remarked, that the author is still too exclusively occupied with England. Thus, in his article on the tertiary formations, he does not give even an idea of the geological constitution of each European basin, but dwells on certain deposits, such as the crag; or on certain localities, as those of London or Paris; while the great inferior Sub-Apennine formation is too briefly adverted to. His lists of fossils have been amended; but it is to be regretted that he has admitted too readily the authority (*les déterminations*) of Marcel de Serres on the tertiary fossils, and of M. Zieten on the fossils of lias and lower oolites. That part which treats of the ancient rocks is defective. In closing his article on *elevations* of the globe such as M. E. de Beaumont has imagined, he adds this curious remark, that in England there have been three directions of elevation, at three different epochs; but these directions are parallel, and run from east to west. These are, 1st, the elevation of the beds in the Isle of Wight after the deposition of the London clay *; 2dly, the elevation of a part of the greywacke of Devonshire and of the carboniferous rocks of Mendip, and also of part of South Wales, which took place before the deposition of the new red sandstone; and, 3dly, the elevation of the greywacke of the south of Ireland, which was more ancient than the purple transition sandstone (*grès pourpré intermédiaire*).

Various Individuals: Transactions of the Albany Institute, Part I. Vol. I. 8vo.

The Albany Institute is composed of two societies, which are now united, "The Society for the Promotion of Useful Arts in the State of New York, and the Albany Lyceum of Natural History." The most important articles in the present volume are, Art. 2. On the Geographical Botany of the United States, by Lewis C. Beck, M.D. Art. 7. On the Climate of the Valley of the Mississippi. Art. 11. A Topographical Sketch of the State of New York, designed chiefly to show the general Elevations and Depressions of its Surface, by Joseph Henry; and Art. 14. Observations of the Coal Formations in the State of New York, by Amos Eaton.

Higgins, W. M., F.G.S. &c.: The Mosaical and Mineral Geologies illustrated and compared. 8vo, bound in cloth, 168 pages. 1832. Scoble, 110. Chancery Lane.

It is now 217 years since the doors of the inquisition closed upon Galileo, and, if we may judge by the vials of theological wrath from time to time poured out upon the heads of geologists, the world has not grown much wiser since. The harmony of physics and divinity would seem as important as before Superstition vailed to Truth. Astronomy has had her system-makers, who constructed untenable hypotheses, to force her phenomena to agree with holy writ; and the sister science has not been wanting in votaries, who would make the first chapters of Genesis her Procrustean bed. Yet they to whose peculiar province such enquiries belong are not all agreed upon the authenticity of these chapters. Some divines, and learned ones too, hold the inspired portion of the Old Testament to commence with the call of Abraham. Into the merits of this opinion we do not mean to enter; we only notice it to show that disagreement between science and scripture may not exercise so fatal an influence on the latter as many seem to imagine. In the mean time, the theologico-geological dispute may do good. Medicine is indebted to alchemy for one esteemed preparation; and who can say what important facts may be discovered by the keen eye of controversy, even should its object be as frivolous? The present work, as its title imports, is devoted to a comparison of the sacred and scientific systems of geology; and its object is to prove the compatibility of modern discoveries with the description of the creation, as handed down by Moses. For this purpose, short outlines of practical and theoretical geology are given, and in a style sufficiently popular to enable the general reader to judge of the accuracy of the author's conclusions. These are given in the third part of the work; and if he should rise from its perusal unconvinced, he will at least have the satisfaction of finding himself in possession of the leading facts and theories of one of the most interesting of sciences.

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* We confess ourselves a little surprised that M. Boué should find any thing curious in a fact which has been so long known to every tyro in English geology, namely, that the elevation of the beds in the Isle of Wight took place long after the elevation of the rocks of Devonshire and South Wales, on which the red sandstone rests unconformably. The greywacke rocks and coal strata in England have been subjected to numerous elevations, operating in different directions, and at different periods.

ART. II. *Literary Notices.*

PART the First of Dr. Hooker's Continuation of Smith's English Flora, is nearly ready. It contains the mosses, Hepaticæ, Lichens, Charàceæ, and Algæ, with plates.

Part the Second, which will contain the Fúngi, and complete the volume, will be speedily published.

Mr. Bakewell has prepared for publication the Fourth Edition of his excellent *Introduction to Geology*, considerably enlarged, with an additional chapter, containing a review of the prevailing theories of geology, as supported by existing phenomena.

MISCELLANEOUS INTELLIGENCE.

Art. I. *Retrospective Criticism.*

This Magazine Two-monthly, as formerly. — See Preface, p. iii.

Mr. Gordon's Analogies between Plants and Animals. — Mr. Gordon, in his ingenious communication (p. 405—412.), parallelises on Dutrochet's theory of the agency of endosmose in the circulation of the sap, and seems not to be aware of the fact that Dutrochet has, some time since, abandoned this hypothesis as untenable. — *J. M.*

Tapirs in the Regent's Park Zoological Gardens. —To your article on tapirs (p. 458—466.), it might have been added, that two fine animals of the South American species (*Tapirus* americànus) are exposed to public inspection in the Zoological Gardens. They are very interesting creatures, in the shape of the head, extensibility of snout, and in the very remarkable structure of the feet. One of them has, I was told, been but very recently imported; the other appeared sociable, and ate lime and elm twigs out of my hand kindly enough. — *D. J. June,* 1832.

Eccentricity of Appetite in a Horse and a Pointer Dog. — Sir, One of your correspondents records the case of singular caprice of appetite in the goat (p. 471.). This brings to my recollection a somewhat similar instance, which fell under my own observation, in other animals. Some years ago, a quantity of peat soil was thrown down in a heap in the corner of a small field adjoining my house, for the purpose of being used in the garden, as occasion required. A horse that was turned out in the same field (which, I may observe, afforded a good pasture) was in the frequent habit of going to this heap of peat soil, and feeding upon it with as much apparent satisfaction as if it had been a rack of good hay. A pointer dog, also, which was usually kept tied up, on being let loose, would almost invariably go to the heap of soil, and devour lumps of it with avidity. The peat soil, I should observe, was of the dark brown kind, and evidently consisted almost exclusively of vegetable matter; and as it had been brought from a great distance, and was difficult to procure in this immediate neighbourhood, we removed it to a place of safer keeping, deeming it too valuable a commodity to be consumed in feeding our dumb animals. Is this eccentricity of appetite in the horse to be accounted for on the same principle as that suggested by your correspondent in the instance of the goat? But what shall we say to the preference shown for peat soil by the carnivorous dog? Did he eat this dried conserve of *S*phágnum and *C*àrex for the same purpose as he is so often observed to eat the leaves of coarse grass? Yours, &c. — *W. T. Bree. Allesley Rectory, June* 26. 1832.

The Rot in Sheep. (Vol. IV. p. 173. 284. 472.; Vol. V. p. 98. 202.). — Sir, I thank your correspondents (Vol. IV. p. 284. 472.) for calling the attention of your readers, &c. to this disease; but they both write too much as if it were a new complaint, and that they were the discoverers; whereas it appears to have been as well known, and to have committed as great ravages, in former times, as now. Johnson's *Dictionary* gives it as one of the meanings of the word "rot," on the authority of Ben Jonson. If either had taken the trouble to look into the *Encyclopædia of Agriculture*, they would there have found a mass of information on the subject, condensed into a single page, and some of the questions asked fully answered beforehand. The opinions of the older writers on agriculture, on the cause of the rot, may be various; but they appear to have blamed certain plants when taken as food by the sheep, such as the white rot (Hydrocótyle vulgàris), the sundew (Drósera); and it was only last winter that I had the *C*àrex cæspitòsa, I believe, pointed out to me as the blue grass so fatal to stock. The opinion, in the north of England, where the farmers too frequently experience the pernicious effects of the rot, is, that it is the peculiar quality of the food which causes the disease, and the great increase of the flukes in the liver, as these are sometimes found in the most healthy sheep. The most dangerous period, if not the only one, is the autumn, if it is mild, after considerable falls of rain. Pasture land which has been overflowed by streams; or upon cold moist clays, and even stubbles where grain has been shed and sprouted, are then considered more than suspicious; and even horned cattle are sometimes lost by this disease after very unfavourable seasons, as well as deer and hares, which are also known to be similarly affected. The reindeer (*C*érvus *T*aràndus *L.*) brought to England by Lord Ravensworth are said by Bewick to have fallen victims to this complaint. As to medicines, where the quantity composing the flock is numerous, the stock-master would never think of handling his sheep for the purpose; the injury done would more than overbalance the chance of benefit. Nothing remains, if once discovered to have a taint in the beginning of winter, but to take the affected animals to market as soon as possible; or feed upon corn, as on turnips alone augments the complaint; though those that come through the winter will fatten kindly upon grass during the summer months. I have certainly heard of some that were even poked having been recovered by having been depastured upon the salt marshes; and once a friend told me that he had cured half a dozen by administering salt and flour, as he found prescribed in the *Encyclopædia Britannica.* I have, however, understood from a veterinary surgeon, that some very satisfactory experiments, as to results, were made at the veterinary college a few years ago. These, I hope, Mr. Youatt will take care to make public in his forthcoming volumes (in *The Farmer's Series of the Library of Useful Knowledge*) on cattle and sheep. The great care of the shepherd, as may be supposed, is to prevent the disease making its appearance: and this is done principally by removing the stock to the driest and soundest fields in the most suspicious seasons; and they are generally very successful. There appears, also, something in the constitution of the stock, as the hardier breeds are not so subject to it as the long-wooled Leicester breed, and are depastured with safety where the latter would perish. It is not a little singular, and may, perhaps, assist those who would wish to investigate the cause of the disease, that the stocks upon the syenitic hills of the Cheviot, and adjacent and similar soils, are considered not liable to this disease; the herds tell you their sheep may *pine*, but cannot *rot*. As this has been very accurately described by the Ettrick Shepherd, in the *Quarterly Journal of Agriculture*, those who feel an interest in the investigation of the pining may consult that work; though the reasoning as to its cause is too like that which was to prove the cause of Goodwin Sands being Tenterden steeple. — *J. C. Farmer. Nov.*, 1831.

Cats catching Swallows. (p. 84. 273. 471.) — I have heard it before, and I agree with the writer (Vol. V. p. 275.), that these poor animals do not deserve the character they have acquired. It is only the half-starved creature, which is not regularly fed, that is given to stealing: in fact, hunger alone is the cause of their propensity: even human nature is tempted in such cases. Not having a complete set of your amusing Magazine to refer to, I know not if you have inserted before, that cats, contrary to their nature, will stand in shallow water, and catch fish, in fine weather. [See Vol. IV. p. 430., Vol. V. p. 471.] I heard lately of a singular instance of instinct in a cat, belonging to a friend of mine, who lately removed from Streatham to Wandsworth; and carried poor puss, tied up in a bag, with him, to his new abode: he enquired after her, in the course of a few days, and heard that she was nowhere to be found. Having occasion to visit Streatham, at the end of the week, he was welcomed by his old favourite at the door, who had reinstated herself in her accustomed place, apparently as happy as if she had never experienced the removal. Upon enquiry, he found she had traced her way back on foot, as no communication had taken place between the houses, and had returned to her old haunts the day before he arrived: of course, he left her, as a legacy, to the new residents. Yours, &c. — *Cattus.*

Cats without Tails in the Isle of Man. (p. 674.) — A friend of mine has twice brought cats without tails from the Isle of Man, where there is a considerable number, and they may be purchased for a trifle. They are the most plentiful, I believe, in that part of the Island called the Calf of Man. They are rather taller (if I may be allowed the expression), than the common cat, but not so broad and strong; their colour is generally a lightish grey. They resemble more the hare and rabbit, in their movements, than the domestic cat; which, perhaps, may be owing to their hind legs being so much longer than those of the common cat. I cannot speak to their qualities as mousers; one of those which I have seen had four kittens (by a common cat), two of which had very short thick tails (about 2 in. long). I saw them almost every day, and paid rather particular attention to them. The only work in which I have found any account of this species [variety rather] is Le Keux's *Illustrations of Natural History*, vol. i. p. 356., in these words: — "There is also a hereditary variety of the cat in this country without any visible tail. It is not uncommon in Cornwall; and Dr. Leach received one from the Isle of Wight, which, however, could not be reconciled to its new habitation." The "Isle of Wight," I think, ought to be the "Isle of Man." I have conversed with a native of the former island on this subject; and he says he never saw or heard of one there. Le Keux gives also the following anecdote from Dr. Anderson's *Recreations in Agriculture.* "A cat belonging to Dr. Coventry, the ingenious professor of agriculture in Edinburgh, which had no blemish at its birth, but had lost its tail by accident when it was young, had many litters of kittens, and in every litter there was one or more that wanted a tail." I hope the above will prove acceptable to some of your readers. I remain, Sir, yours, &c. — *Mancuniensis. Sept.* 3. 1832.

The last fact seems to answer my question (p. 674.) affirmatively. —*J. D.*

The Stoat, the Changes in the Colour of its Fur, and those Changes rather referable to Atmospheric Temperature than to periodical Change of Season; and the Stoat and its Congeners trace their Prey by the Faculty of Scent. — Sir, I send you some remarks on the *M*ustèla ermínea of Gmelin, called in Britain, in its summer fur, stoat, black-tailed weasel, and large weasel; in its winter fur, ermine, and white weasel. J. M. states, at p. 77., that "the stoat does not change its colour here, as in the northern parts of the world, by which its fur becomes so valuable an article of commerce, though it has been observed that its breast and throat are whiter in winter than in the summer months."

I will, in the first place, observe that if J. M. had looked into our best work on *British Zoology*, by that classical and learned naturalist Pennant, he would have read that not only the stoat, but also the common weasel (*M.* vulgàris *Gmel.*), sometimes becomes white in Great Britain. "In the most northern parts of Europe," says he (*British Zoology*, vol. i. p. 115. edit. 1812), "these animals (stoats) regularly change their colour in winter, and become totally white, except the end of the tail, which continues invariably black, and in that state are called ermines. I am informed that the same is observed in the highlands of Scotland. It is sometimes found white in Great Britain, but not frequently, and then it is called a white weasel. That animal is also found white, but may be easily distinguished from the other in the ermine state, by the tail, which, in the weasel, is of a light tawny brown." I may here remark, incidentally, that, from the common weasel's occurring of a white colour, Linnæus named it, in his *Fauna Suecica* (p. 7.), *M*ustèla nivàlis. I will now endeavour to show, from my own observations, that the white dress of the stoat in England depends on the temperature of the atmosphere, either according to situation, or according to the severity of the winter; and not on the periodical change of the seasons, as Pennant seems to imply in the following words (p. 116.): — "With us it is observed to begin to change its colour from brown to white in November, and to begin to resume the brown in the beginning of March." Within the last nine years I have had the good fortune to meet with two ermines alive, and in two of the most different winters that have occurred for a great many years: the one was in the extremely severe winter of January to March, 1823, and the other was in the almost as extremely mild January last of this present year (1832). The first ermine which I saw (in the month of February, I believe) in the year 1823, was running in and out of a hedge by the side of a turnpike road. The ground at the time being covered with deep snow, I should scarcely have noticed it, had it not been for the blackness on the extreme half of the tail. As I was on horseback, it allowed me to approach near to it, when, standing for some minutes on the bank of the hedge, and looking boldly at me, I found it a fine large animal. The upper part of its body was of a beautiful clear white; but its belly, legs, and tail were of a yellowish tint, which was more distinguishable, by being contrasted with the purer white of the snow. The second I met with on the 23d of January last. While riding along a road, my attention was suddenly attracted to a white animal bounding extremely quickly across the road from one hedge to the other; and on going to the spot where it had entered the hedge, I soon caught sight of it again, a little way off, when I was delighted to find it prove an ermine of the most beautiful white, having the bushy black tip on the tail. I watched it some time running up a large pasture, keeping near a thick hedge, in which it at last disappeared. The day was unusually mild for the season; the sun shone bright; no snow was on the ground. The ermine seemed as if out of its element, and even at a considerable distance looked conspicuously white, and, I may add, for its own safety, dangerously so.

Providence, ever kind and protective of all the several animals of her creation, has so clothed most beasts and birds of the forest and of the field, of the mountains and of the plains, the reptiles also, and insects, with such furs, and feathers, and skins, of such colours, and of such shades, as shall be most conducive to their safety, and in harmony with the colours of the places of their habitation. For if it were not so (as in the present case), a pure white ermine, a white hare, a white pheasant, or the like, living on the dark-coloured ground, would immediately be seen by their enemies, and would quickly be destroyed by them.

In consequence of the months of December, 1831, and January, 1832, last, having been so unseasonably fine, without any snow, but with occasional slight frosts, I was greatly surprised to find this stoat clothed in his winter fur; and the more so, because I had seen, about three weeks or a month before, a stoat in its summer coat, or brown fur; concerning which I will hereafter add a remarkable fact. I was, therefore, naturally led to consider whether the respective situations, which the brown and white stoats seen by me this warm winter inhabited, could alone account for the difference of the colours of their fur, in any clear and satisfactory manner. The situation, then, where the brown stoat was seen, is in N. lat. 54° 32′ nearly, and W. long. 1° 19′ nearly, upon a plain, elevated a very few feet above the level of the river Tees, in the county of Durham. Again, the place where I met with the ermine, or white stoat, on the 23d of January, 1832, is in the North Riding of Yorkshire, in N. lat. 54° 12′ nearly, and W. long. 1° 13′ nearly: it is situated at a very considerable elevation, and in the immediate neighbourhood of the lofty moorlands called Hambledon Hills. These constitute the south-western range of the Cleveland Hills, which rise in height to 1100 ft. or 1200 ft. above the sea. At the time, the ermine was making towards the hills, where, no doubt, he either lived, or frequently haunted; and, consequently, the great coldness of the atmosphere, even in a mild winter like the last, upon such an elevated and bleak spot as that moorland, would satisfactorily account for the appearance of the animal in its white fur; although the place is in a direct line, more than twenty-three miles distant to the south of the fields, near the Tees, inhabited by the brown stoat. And it is somewhat worthy of remark, that the hedge where I noticed the first ermine, or white stoat (in February, 1823), is on the same plain, and within a mile of the place in which I saw the brown stoat in December, 1831, and at much the same height above the river. But in that winter the extreme coldness of the air would cause the same vicissitude of colours, even at so low an elevation.

I have already observed that a kind Providence has given to most animals such colours of the fur, plumage, and skin, as shall best conceal them from the sight of their enemies: I may now remark that the same Providence has ordained that many animals shall experience a change of colour, when the colour itself of their natural abodes shall likewise change; and that both the colour of the animal and that of the ground shall still harmonise and become the same. Such is the case with many animals that inhabit the frozen regions and the cold latitudes of the world; the polar and the alpine countries. The wolf, the fox, the hare, the ptarmigan, &c., undergo this variation in the colder tracts; and even in the temperate climate of our island, among others, the ptarmigan and the hare do so. Concerning the latter, the zoologist before quoted (Pennant, *Brit. Zool.*, vol. i. p. 130.) relates: — "In the winter it" (the varying or Alpine hare) "entirely changes to a snowy whiteness, except the edges and tips of the ears, which retain their blackness. The alteration of colour begins in September, and first appears about the neck and rump: in April it again resumes its grey coat. This is the case in Styria (Kramer, *Austr.*, p. 315.); but in the polar tracts, such as Greenland, it never varies from white, the eternal colour of the country. In the intermediate climates between temperate and frigid, such as Scotland and Scandinavia, it regularly experiences these vicissitudes of colour."

But here it must be remarked, that the stoat, the hare, the ptarmigan, or any other beast or bird of varying fur or plumage, cannot be supposed to commence the variation of colour in September or November, and to rechange it in March or April in every year, without being under the direct influence of a less or a greater degree of temperature of the atmosphere. The increased coldness of the air, which generally takes place at the approach of winter in the northern latitudes, in the Alps (as in Styria), and in the lower mountains of the temperate climates (as in the highlands and moorlands of Great Britain), is, I conceive, the true cause of the regular variation from brown to white, in those animals; and, again, as the coldness gradually diminishes, and as the warmness of the atmosphere at such situations increases, their summer colours begin to reappear. Pale and light colours, as white, &c., seem to belong naturally to the northern or cold countries, and they are predominant in every part of the creation; in animals, in plants, in minerals, as silver, &c.: but, on the contrary, dark and bright colours, as black, &c., are peculiar to the southern or warm climates, and are observable in the animal, vegetable, and mineral kingdoms. And, indeed, in those polar tracts where the cold remains equally intense throughout the year, and where "stat glacies iners menses per omnes" ["fast-fixed ice prevails through every month"], these same animals, whose colours are known to vary in more hospitable and less severe climates, never undergo any vicissitude, but continue to vie with the pure whiteness of the snow, with which nature is there perpetually clad. Hence, the transition from the summer to the winter colours of all such animals depends principally upon atmospherical temperature; arising either from a high latitude, or from an alpine or mountainous range, or from the casual severity of the winter in a low and temperate region, and not merely from the regular and annual succession of winter to autumn.

In conclusion, I will relate two curious facts respecting the habits of the stoat, which, I believe, have not yet been described in any of our works on British quadrupeds. One, to which I have above alluded (p. 719.), is, that whilst walking along a footpath in a field, one day in the last week of December, 1831, I observed a stoat, or a weasel, coming in the same path towards me. I immediately stood still, and, as he approached, I found that he carried his nose in the same relative bearing to the ground, and was in the act of running the scent of some bird, or other small animal, exactly after the manner of a dog "on scent," and in chase after game. His whole attention being to the ground, with his head down, he did not see me until close to me, when, suddenly catching sight of me, he turned a little aside, stopped short, looked up, and then scampered back along the path, with his tail erected into somewhat of a curve, from the black end of which I was able to distinguish him from a weasel, and, bounding into a hedge near the path, he there concealed himself; whence he would probably go forth again, when he perceived that all was safe, and would perhaps follow up the scent from which I had disturbed him. I was thus an eyewitness to the fact of a stoat being able to pursue its prey on scent, and I have little doubt that nature has given the sense of smelling, in a similar degree, to the weasel and polecat; which will therefore readily account for their being so destructive to game, and chiefly for their instinct in finding the nests of partridges and pheasants during the breeding season.

The remaining fact is, that a stoat does sometimes take to swimming. Walking on a fine evening in the spring, a few years ago, by the banks of the Wear, between Schincliffe Bridge and Old Durham, I noticed an animal swimming in the water; and, making haste to the place, which was just below the same bank whereon I was walking, I saw that it was a stoat: it then swam gently across the river, which is there both deep, and of a considerable width, to the opposite bank, where, owing to the thick brushwood, I lost sight of it. In the act of swimming, it lifted its head and neck well out of the water, like a dog; and so differed from a water rat, which usually keeps its head close along the surface. It becomes me, however, to remark, in this case, that the size alone of the animal made me think it a stoat, and not a weasel; for I could not distinctly see the specific blackness on the tail.

I ought to apologise for the length of this communication; but I hope it may tend, by the facts I have narrated, and for the accuracy of which I can vouch, towards a farther illustration of the history of the genus *Mustèla*. I am, Sir, yours, &c. — *Zoophilus. March* 30. 1832.

The above communication was received on March 31. 1832, too late to accompany those published April 2., in p. 293—297., on the same subject. Still, the facts and views exhibited by Zoophilus are sufficiently distinct from those presented in p. 77. 293—297. 393. to merit the space they occupy. Γ will find in them almost a solution of the query he submits, p. 295, 296.; namely, "Is the degree of change in the colour of the stoat's fur regulated by the severity of the winter generally, or by the severity of particular parts of the winter. Does the fur change for the season, or with the season?" As, too, Zoophilus feels no doubt that the animal he saw spontaneously crossing the river Wear was a stoat, this fact arranges itself with testimony of a similar indisputable one, adduced by Γ, p. 296. Zoophilus accompanied his communication with a remark, that no good British figure of the stoat has yet been published; and advised us, if disposed to figure the animal, to direct our draughtsman's attention to "the stuffed specimen, in snow-white fur, nearest the window, in the case which contains several ermines and stoats in different states of change of fur, in the animal room in the British Museum." Zoophilus remarked on the figures already extant as follows: — "Bewick's cut, in his *History of Quadrupeds*, is not accurate nor natural, and is too small; and the plate in Pennant's *British Zoology* is abominable, endeavouring to represent the creature half white and half brown! In Shaw's *Zoology* the figures are somewhat better, but still nothing like nature. F. Cuvier, I believe, has not figured the ermine in his *Histoire Naturelle des Mammifères*; nor is there any sketch of it in the *Gardens and Menagerie of the Zoological Society delineated*." — *J. D.*

Birds and Mammàlia found in the Neighbourhood of Wensleydale, in the North Riding of Yorkshire. (p. 553.) — I may now add Caprimúlgus europæ̀us, found in the wood above Richmond; Lànius excùbitor, one or two individuals; Muscícapa luctuòsa, one or two individuals; Sýlvia *Tróchilus*, and Pàrus caudàtus: the last two were omitted by oversight. In Mammàlia, besides the more common species, we have the otter, (*L*ùtra vulgàris), white hare (*L*èpus variábilis), marten cat (*V*ivérra *foìna*), rare. Of the badger (*U*rsus *M*èles), two specimens were taken two years ago on the banks of the Swale. The stoat (*M*ustèla ermínea) is common here; its fur becomes of a pure white in winter. — *M. P.* [misprinted M. R. p. *555*.] *Sept.* 8. 1832.

M. P. proposes to communicate supplementary lists of species as they may come under his observation. This intention induces us to remark that local lists are not very welcome to us, unless they be restricted to the rarer species, or be rendered interesting to all readers of the Magazine by original notices of the habits and manners of the species included in the lists. — *J. D.*

Additions to M. P.'s "List of Birds [and Fishes] found in the Neighbourhood of Wensleydale, in the North Riding of Yorkshire." (p. 553.) — If M. P. includes the neighbourhood of Middleham in the district of whose fauna he has sent you a catalogue, he has omitted some of the more common birds. Thus, he gives Córvus [Bombicívora] gárrulus, and Lóxia curviróstra; and passes over the landrail (Ortygomètra Créx *Flem.*), and the willow wren (Sýlvia Tróchilus *Latham*), although there are at least a hundred of each of the latter two for every one of the former two. I notice a few others omitted by M.P. The henharrier (Fálco cyàneus *L.*, Círcus Pygárgus *Flem.*); the merlin (Fálco Æ'salon *Temm.*), rare; the nightjar (Caprimúlgus europæ`us *L.*), very rare indeed; the wheatear (Saxícola Œnánthe *Bechstein*), not very common; the winter wagtail (Motacílla Boárula *L.*), rarer than the pied wagtail, but frequently met with; the yellow wagtail (*M.* flàva *L.*), seen occasionally.

Willow wren (Sýlvia Tróchilus *Latham*). No bird is here more common. I see them every day sporting among the rose bushes in search of aphides; and this week, the windows having been accidentally left open, I have captured two on two successive days, and allowed them to fly about the room for some time, when one of them occasionally uttered a little sharp note.

Landrail (Ortygomètra Créx *Flem.*). This bird is very abundant in the spring. It is common about East Witton, and most probably at Wensley; but is only heard while the grass remains uncut. It is very shy; and, although it will allow you to approach within a few yards of it without its ceasing its loud note, it is almost impossible to obtain a sight of it, unaided by a dog. Notwithstanding this, the mowers frequently capture them; and I have been assured that not fewer than ten were taken by the mowers last summer on a neighbouring farm: they are also occasionally run down by means of small terriers. It is, in some measure, a nocturnal bird, as its note is but seldom heard during the day, but commences about seven or eight o'clock in the evening, and continues with little intermission through the night.

The common sandpiper (Tótanus *hypoleùcus* Temm.). Very common in some parts of the Yore (less properly spelt Ure): it also occurs in Cover Scarr, whence I have a specimen.

The dabchick (Pódiceps mìnor *Latham*). About a mile from East Witton, on the banks of the Yore, is a large fishpond, belonging to the Marquess of Aylesbury; half of it is very retired, and the whole of the west side is thickly wooded. Amid the reeds and sedges with which it is surrounded, dabchicks are very plentiful; but I have seldom seen them in the adjoining river, although the south bank (the same side with the fishpond) is covered with a profusion of similar reeds, &c.: but, as a public footpath winds along the river, this situation is, perhaps, too much exposed. I have never met with the nest.

The coot (*Fùlica àtra L.*) is also common in the above-named fishpond, but I have never seen the nest.

Fishes in the Yore. M. P. to his list (p. 555.) might have added the barbel (*Cýprinus bárbus*), and the eel (*Murǽna Anguílla L.*). I have frequently seen these caught in the river, and eels are abundant. The Cover, a little river which gives name to a dale adjoining Wensleydale, contains the minnow, grayling, smelt, trout, and eel. Very large salmon come up it to spawn, and I have often seen them caught by hand, and great numbers are taken by a poaching practice called "blazing." — *William G. Barker. East Witton, July* 21. 1832.

The Woodcock. (p. 570.) — With every deference due to the writer, I beg to offer a few remarks on that strange exhibition of parental dexterity in the woodcock, inserted p. 570.

"It was a hen bird flying off with a young chicken in her talons," said the principal gamekeeper. Had I been present when the keeper said this, I should have supposed that he was speaking of a bird of prey. The woodcock has no talons. To talk of the talons of a woodcock, is just about as apposite as if we were to speak of the long and taper toes in the delicate paw of a bear. Again, I am at a loss to comprehend how the keeper could distinguish the female from the male woodcock when on the wing.

The gamekeeper stated "that it always builds its nest in a dry situation; that it generally has three chicks; that immediately after they are hatched, and until the chicks can fly, the cock and hen bird regularly, every morning and evening, clutch the chickens in their talons, and fly with them to the nearest springs, where they continue till the chicks have fed, when the old birds reconvey them in the same manner to the nest."

On examining the foot of the woodcock, we see at once how impossible it is for this bird to carry off its young by the instrumentality of its feet. Talons, which are of such essential service to birds of prey when grasping their victims, are totally denied by nature to the woodcock. In lieu of a hind toe of proportional length, and armed with a talon, which is such a powerful and at the same time such a necessary countersupport to the compressing action of the fore toes of a bird of prey, there is only given to the woodcock a small delicate toe, placed so high up the leg that its extremity barely touches the ground when the bird is in a standing position.

Now, granting, for sake of argument, that the woodcock could grasp and secure in its feet the newly hatched young, surely the daily increasing size of that young would soon prevent the carrier parent from transporting it from place to place.

Still, the gamekeeper positively said, that, until the chicks can fly, the woodcocks, male and female, did actually clutch the chickens in their talons, and fly with them to the nearest springs, and then reconvey them to the nest.

Now, in fact, there was no need for the parent birds to load themselves thus, because their young ones can run immediately they are released from the shell. Moreover, the extra labour which the parent birds took in returning to the nest is quite out of the order of ornithological things, inasmuch as the woodcock's nest scarcely deserves the name of nest, being little better than that of a partridge or of a pheasant. The young of the woodcock, as well as the young of these just mentioned birds, come out of the shell with their eyes open, and of course they leave the identical spot of ground where they were hatched, as soon as their down is dry, and never return to it more. Add to this, that the woodcock is known to feed by night; wherefore I am at a loss to account for that part of the keeper's narrative in which the woodcock is said to fly off every *morning* with its young in its talons to the nearest spring, and there continue till the chicks have fed.

I own I like old Ovid's story of parental and filial evolutions through the air, best of the two. Let Minos, said Dædalus, prevent our travelling both by land and water, if he chooses. "At certè cœlum patet—ibimus illâc." "But surely the sky is open to us, and that's our road, my boy!" On saying this, he set to work and made wings. Having fastened one pair on his own shoulders, and another on those of little Icarus, off they went through the liquid void, leaving in unutterable amazement all who beheld them!

[*Answer to the Question at* p. 603. *on the Nightjar's transporting its Eggs, as suggested by Audubon's declaration of the Carolina Goatsucker's so doing.*] While on the subject of birds conveying their progeny, I take the opportunity of informing J. D., who, in page 603. of the last Magazine, asks "if our fern owl removes its eggs to another place when they have been discovered," that I am firmly persuaded that no bird ever intentionally removes its own eggs from the place where they were first deposited. The testimony which J. D. introduces into the marginal note, at p. 603., ought to be received with no common degree of caution; because the eye which could fancy that it saw a rattlesnake swallow a large squirrel, tail foremost, might equally fancy that it could discern, at sixteen or eighteen yards distant, the Carolina goatsucker stowing away its eggs in its mouth, and then flying off with them to another part. — *Charles Waterton. Walton Hall, Sept.* 16. 1832.

The Barn Owl's extensive Destruction of Vermin. — Many and hearty thanks to Mr. Waterton for his remarks on the barn owl, p. 9.; and I hope your Magazine will be enriched with many more articles, written in the same familiar style, and from the same masterly pen. I had, previously to reading the article referred to, made a few observations on these ill-treated birds; I have since added others, which you will oblige me by inserting, should you deem them worth it. The principal entrance to this garden is through the abbey gate (formerly the grand inlet to the monastery of St. Edmund), in a part of which the barn owl has long since taken up his abode, and has a nest of young ones at this time. I was doubtful whether they destroyed so many mice, &c., as represented by Mr. Waterton (p. 13.); I therefore watched them one evening, and in the short space of twenty minutes the old birds carried food to their young twelve times. Next morning, with some little difficulty, I climbed into their "hall," from which a hole leads to their nest. At the entrance of the hole sat "master Billy," sound asleep, and "bolt upright." He appeared to be rather displeased at my visit, as he threw himself into a posture of defence, but ultimately retreated into the hole. The "hall" is about one yard square, and 9 ft. high, and the bottom was covered several inches deep with their pellets. I promiscuously picked up twenty of them to examine, and found them to contain skeletons of the following animals: —

The 1st, a shrew, and a small bird, I think a wagtail; 2d, 7th, 11th, and 16th, three mice each; 3d, a rat, about half grown, and two mice; 4th and 12th, a rat each; 5th, 10th, 14th, and 15th, four mice each; 6th, a rat and a mouse; 8th, a mouse, a shrew, and a bird; 9th, three mice and two shrews; 13th, a shrew and four mice; 17th, a shrew and a rat; 18th, a rat and three mice; 19th, two mice and a bird, which, from the length of its toes (spurs), I believe to be a lark; 20th, four mice and two shrews.

I have read somewhere that the owl will strike and kill the shrew, but not eat it; but the above shows that it eats many of them.

A friend of mine, who kept pigeons, and had often had a great number of his young ones destroyed, laid it to the poor owls which visited his premises, and accordingly one moonlight night stationed himself, gun in hand, close to the dove-house, for the avowed purpose of destroying the "feathered rascal." He had not taken his station long, before he espied poor Billy Wix, flying from the locker, with a load in his claws; pop went the gun, down came the owl; when, oh! dire to relate, instead of the young pigeon, which my friend's imagination had loaded him with, it was an old barn rat, nearly dead: proof of the utility of these birds. — *Henry Turner. Botanic Garden, Bury St. Edmunds, July* 17. 1832.

The Common Buzzard (Bùteo vulgàris Fleming), *in captivity hatching the Eggs of the common Fowl.* (p. 383, 384.)—I have at the present moment [May 8. 1832] a female buzzard, showing all the signs of wanting to sit described p. 384. by my friend Mr. Yarrell; but, as she has a male bird with her, I shall not gratify her by giving her hen's eggs to sit upon, in the hope that she will herself lay eggs for this purpose. — *Thomas Allis. York, 8th of the 5th month (May),* 1832.

In my last letter I mentioned having a female buzzard then showing an inclination for laying. She did lay one egg. She was confined in a place in which she had, as companions, another female buzzard, a male buzzard, four kites, three kestrels, and two owls. Five or six days after she had laid the egg, as I saw no probability of her laying a second, and as I had never noticed the male bird to pay her any attentions, and consequently apprehended that her one egg would prove barren, I added four fowls' eggs to her own, that she might sit. She immediately began sitting; but in little more than a week I missed her own egg, and could never discover any trace of it, or guess what had become of it. She however continued sitting on the fowls' eggs; and I was surprised to find that, although I had never observed any previous attentions on the part of the male bird, during her incubation he became very attentive to her, and mostly took his stand close by the nest, and when she went off to feed, he took her place on the eggs. At the end of three weeks, three out of the four eggs were hatched. And now came the difficulty; for although I could fully depend for the protection of her young charge on her affection, I could place no such dependence on her predaceous companions, each of which would have gladly made a meal off one of her chicks at the first opportunity. I therefore removed them to another situation; but her affection for her old residence overcame that she felt for her foster-progeny, of whom she took not the slightest notice. I removed them back to their old nest, when they were all but dead with cold. She immediately resumed her care over them: next day, as it was time for the chicks to be running about, and there was no dependence to be placed on their keeping longer in the nest, I removed her to a partition of her own habitation; but here the same scene was reenacted. Though she had a quarter part of the whole enclosure for the sole use of herself and family, she felt so indignant at even that degree of extra-confinement, that she paid no regard to her charge, but made incessant attempts to get into the other parts of the enclosure: I therefore had no alternative but removing the chicks to a mother of their own species. Another year I am inclined to hope that, by secluding the male and female before pairing time, I may succeed in rearing some of their own young. — *Thomas Allis. York, 27th of the 6th month* (*June*), 1832.

The Grey Phalarope. (p. 282, 283. 379. 589.) — When Bewick compiled his *British Birds*, this species was deemed so rare, that no more than four specimens were on record as having been caught in the British islands. The Magazine of Natural History contains proof, however, that this bird is not so very rare as had been supposed; and that at times it is even abundant will appear from the following notes, inserted under the proper dates, in my journal.

1829. — The grey phalarope is not uncommon in January: but their manners make them seem rare. They never perch on rocks or the sand; but they alight on the water with facility, and stem a rapid tide with ease and rapidity. They may be approached without difficulty, but carry off very much shot.

1830. Nov. 4. — The grey phalarope here. Mr. C. Jackson of East Looe (who is well acquainted with the birds of Cornwall, and from whom I have received much information of a general kind, and of this species in particular) shot four specimens. In their stomachs were maggots, taken from swimming sea-weeds, and in one a few bits of coal. They dart after a maggot as a wagtail after a fly, and will venture among heavy waves with greater boldness and agility than a gull.

1831. Oct. 21. — The grey phalarope now abounds all along the coast, at least between Looe and Fowey. Out of one flock of about fifty, nine were killed at two shots, and ten in all. Mr. Jackson had at one time twenty-one specimens; and more might have been procured if the weather would have allowed. It is probable that the stormy weather has caused them to be accumulated on our coasts. The specimens here noted varied in plumage very considerably; and even in the colour of the legs scarcely two were alike. In a few, the back scapular feathers and plumage beneath the body so much resembled what is described as belonging to the red phalarope, that Mr. Jackson was led to doubt whether there be indeed any distinction between them. Marks sufficiently distinctive have indeed been pointed out, in the different forms of their bill and feet; but as this has mostly been done by those who have not themselves compared the two species together, both Mr. Jackson and myself will feel gratified if some reader of the Magazine will take the trouble to compare these birds together, in reference to their characters in this respect, and communicate the result to the public. — *J. Couch. Polperro, July* 14. 1832.

Some technical remarks on the red-necked phalarope of Bewick (Phaláropus fúscus) are presented, p. 417. — *J. D.*

The Gallinule (*Gallínula chlóropus* Latham) *a Percher, and good for Food.* (p. 381.) — Sir, The facts of the gallinule (or waterhen, or moorhen as it is usually called here) being a percher, at least occasionally so, and of its being excellent for food (see p. 381.), are no new discoveries in natural history. I have often seen the bird settle in hedges, and as often started it from such situations. I have also occasionally observed it to perch on the low boughs and bushes which overhang the water. No bird differs more as an article for the table; I have frequently partaken of them, when they have proved excellent; while at other times I have found them strong, tough, and skinny, and altogether unfit for the purpose. I have heard of an old German sportsman who, while on a visit in this neighbourhood, requested that this bird might be dressed and served up at table, observing that "de vater hen was very goot; they do eat it in Germany." I cannot, however, agree with your correspondent, J. C., that it is, even when the best is made of it, "as fine eating as any woodcock;" neither am I in the habit of having the bird skinned before it is cooked. Yours, — *W. T. Bree. Allesley Rectory, May* 10. 1832.

Since J. C.'s communication, p. 381., was published, and this from Mr. Bree received, another instance of the moorhen's habits of perching on a tree, and even breeding there, has been received from Rusticus, and published, p. 601.

In Montagu's *Ornithological Dictionary*, a short but valuable essay, entitled "Feet of Birds," occurs in p. 178. of Rennie's edition. This essay exhibits the admirable fitness of the structure of the foot, in almost every species of bird, to the bird's habits of life. Among the remarks on the various modifications of the webbed foot, which the swimming and diving birds exhibit, it is thus observed of the waterhen, or, as the inhabitants of the Fens of Cambridgeshire call it, the moorhen (Gallinula chlóropus *Latham*): — "There are also some birds which swim and dive well, whose toes are long and slender, and not furnished with webs or fins, such as the waterhen and rail; but these live as much on land as on water." — *J. D.*

The Waterhen (*Gallínula chlóropus* Latham), *when disturbed on its Eggs, covers them before it leaves them.* — I was once fishing on the banks of the Thames, and had strolled into a willow holt, overgrown with reeds and rushes, when, moving gently onward, I heard a slight rustling motion. I kneeled down, and remained quiet for some little time, when the noise subsided. On rising and looking about, to see whence the noise had proceeded, I saw a waterhen busily employed in collecting dry rushes and flags, and laying them one by one over her eggs, which were in the nest close beside. It was not long before they were completely hidden; and then looking round with a cautious glance, and apparently satisfied with her labour, she softly glided among the reeds, and was lost to my sight. A few minutes afterwards I heard a little plunge, and soon saw her sailing away for the opposite shore. When I approached the nest, I at first could scarce tell where it was, and no one who was not previously acquainted with its situation could possibly have discovered it. The inference, then, to be drawn from this is very plain, namely, that I had disturbed her while sitting, and she, concluding that danger was at hand, concealed her eggs from the observation of whatever or whoever might cause that danger. — *H. B. Somerset, March* 31. 1832.

The Spotted Gallinule (*Gallínula* Porzàna *Latham*). — One male specimen was a few days ago shot in a marsh adjoining the river Shannon. The contents of its stomach were too much digested for any thing to be distinguished. The gizzard, which was strong and muscular, contained a good deal of gravel, and some broken shells. The bird measured 9 in. in length, and 14 in. in breadth. There was another, I suppose the female, seen in the same place a few days afterwards. — *T. K. Killaloe, Sept.* 21. 1832.

The Gizzard of the Corncrake (*Rállus Créx* L., *Ortygomètra Créx* Fleming). (p. 68. 298.) — Sir, Like the author of *The British Naturalist*, Mr. Dovaston contends (p. 298.) that "this bird has a strong muscular gizzard, notwithstanding the doubt expressed by A. R. Y. (p. 68.)." I apprehend that Mr. Dovaston and myself differ (as is often the case in other controversies) in little more than as to the terms in which one and the same proposition should be best enounced. My remark on this subject, in the review of *The British Naturalist*, was drawn forth by reading in that work that the corncrake had "a strong muscular gizzard, *like poultry and the other birds that live upon seeds.*" Now, the gizzard of the crake is, at all events, very unlike that of poultry, but resembles that of the woodcock, &c. Since writing the article alluded to, I have carefully examined the bag or gizzard of the last-mentioned bird*, and admit that it may, perhaps, without impropriety, be called "strong and muscular:" but still it is very unlike the gizzard of poultry, the habits of the bird not requiring so powerful an engine; and by comparing the gizzard of either bird to that of poultry, the author of *The British Naturalist* is surely likely to mislead his readers. I cannot conclude this notice without expressing my thanks to Mr. Dovaston for the handsome manner in which he has spoken of the review of the *The British Naturalist.* Yours. — *A. R. Y. April* 6. 1832.

Does the Landrail or Corncrake (Ortygomètra Créx Flem.) *breed in the South of England?* — It breeds here; but, contrary to what one would suppose, its numbers are fewer afterwards; and I suppose from this that there is a migration farther south. The last I heard call was towards the latter end of July. The partial migration of birds is a subject insufficiently known; and our knowledge of it can be most, and perhaps only, promoted by publishing the dates of arrival and departure, in various places, of the birds which are known to remain in some one or other part of the country the entire year. — *T. K. Killaloe, Sept.* 21. 1832.

Food of the Water Rail (*Rállus aquáticus* Linn.). (p. 68. 299.) — I have found only vegetable substances in the stomach of this bird. I have a preserved stomach and œsophagus of one of these little birds, containing nine large grey peas and small horse beans. It appears that the bird swallowed them dry, and that they afterwards swelled with the moisture of the stomach, and so distended the stomach and the œsophagus as to deprive the former of the power of digestion, and occasion the death of the bird. — *Thomas Allis. York, 8th of the 5th month* (*May*), 1832.

A bad figure of the water rail is given Vol. I. p. 289. fig. 154., and the faults of the figure are pointed out, Vol. II. p. 302. The instance of the white water rail captured in Berkshire, and described in p. 384. of the present Volume, are additional facts in the water rail's history. — *J. D.*

Is the Water Rail (*Rállus aquáticus* Linn.) *migratory, or not?* —In reply to the query of E. P. T. (p. 397.), I can inform him, that, so far as relates to this neighbourhood, it is migratory. The bird arrives here about the middle of November, and may be found in most of our small streams. I have never seen it later than the end of February or beginning of March, nor have I ever known it to breed here; though we have some very favourable and retired situations for that purpose, were it inclined to stay. In Montagu's *Ornithological Dictionary* it is stated that " this bird continues with us all the year." It may probably remove farther north to breed, without leaving our island: but I think it must come from a colder climate, as it spends only the winter months here. Perhaps some observer of nature, who may reside near the summer haunts of this bird, will oblige us with further information on the subject, as it appears doubtful whether the bird leaves the kingdom or not. — *T. G. Chipping Norton, Oxon, May* 15. 1832.

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* An irregular piece of grit or stone, larger than the seed of the sweet pea, now lies before me, which I took from the bag of a woodcock.

Brief remarks on the water rail occur in a note, p. 68., and in p. 299. — *J. D.*

The Food of the Scoter Duck (*A'nas nìgra* Linn., *Oidèmia nìgra* Flem.; *and the Food of the Eider Duck* (*A'nas mollíssima* Lin., *Somatèria mollíssima* Flem.). — I have this spring had an opportunity of examining the contents of the stomach of the scoter and that of the eider duck. The stomach of the scoter was filled with a few whole middle-sized shells of the *T*ellìna solídula, a number of fragments of the same, and broken Cárdium edùle *Lin.*, or common cockle. The stomach of the eider contained only fragments of small testacea. — *Thomas Allis. York, 8th of the 5th month*(*May*), 1832.

Additional remarks on the scoter duck occur in p. 82. of the current Volume. — *J. D.*

The Food of the larger Grebes (*species of Latham's genus Pódiceps*). — In the stomach of the larger grebes I have uniformly found a considerably sized ball, composed principally of feathers. Are the feathers composing this ball plucked by each bird from its own body in pluming itself? or are they the feathers of birds which the grebe may have eaten? — *Id.*

The Fork-tailed Petrel (*Procellària Leàch*ii. (p. 282, 283. 380. 589.) — The present year seems to have been singularly productive in birds of this species. I have one which was found dead in a field near this place. — *Francis Orpen Morris. Charmouth, Dorset, Sept.* 1832.

The Fork-tailed Petrel taken at Birmingham. — In p. 283. mention is made of two stormy petrels taken at Birmingham; and it is stated that of these, " one was found in Bradford Street, and is now placed in Weaver's museum." Since the appearance of that notice I have seen Mr. Weaver, who informed me that the specimen now in his museum is an individual of the fork-tailed petrel. — *W. T. Bree. Allesley Rectory, June* 25. 1832.

European Singing-Birds in India. (Vol. II. p. 207.) — Some of the birds here mentioned may have been Indian, though their names are English. Skylarks are abundant there; and, when taught, are greatly esteemed as excellent mocking-birds: their imitations are, indeed, astonishing. That of the *distant* wailing cry of the kite soaring high in air has more than once completely deceived me, even when the lark in its cage was on a table in the room, within a few feet of me. They are taught by being carried daily to the fields and groves, in close covered cages. I have known 4*l.* given for a fine bird. They are fed on grasshoppers, with millet and other small grains; when dull, they are stimulated to song by a dose of *marking nut.** This is administered very cleverly, by pricking a grasshopper with a needle, the point of which has been previously tipped with a little of the acrid juice, and giving it to the bird to eat. The cage used is low, and the bottom is kept covered with gravel. — *A Subscriber. Vale of Alford, Sept.* 28. 1832.

The Term Cínclus, as the Epithet in the Name of the Species of Bird called Stúrnus Cínclus. — In Vol. II. p. 400., Mr. Dovaston says, " *Cínclus* is derived from the Greek for a thrush, κιχλη. By many ornithologists it [the *Stúrnus Cínclus*] was and is incorporated with the *Túrdi*; and the present specific is probably retained for no other reason." I think this must be an oversight: *Cínclus* is surely the Greek κιγκλος, from κινεω, to move, bob, &c.; and, therefore, not an "ill-sorted," but an " excellent good " name, and " well suiting the " beck and nods " " of this neat, nimble, and lively" favourite of your " excellent good " and " lively " correspondent. — *Id.*

" *Nightingales seem to love low Meadows and bushy Grounds.*" Mr. Dovaston. (p. 426.) — In just such a situation they occur here. To my knowledge, there have been ten eggs of nightingales destroyed this year out of the meadow of the old botanic garden, the lowness of which may be well conceived of from its having the Linnet (a brook or rivulet) on one side of it, and the river Lark on the other; and it abounds with willows, alders, and a mixed collection of shrubs. — *Henry Turner. Bury St. Edmunds, June* 10. 1832.

Three Individuals of the Hawfinch or Grosbeak (*Cócco-thraústes commùnis* Brisson) were, in the winter of 1831, shot in the Phœnix Park, near Dublin. The mention of this fact may be welcome to Mr. Stewart, whose remarks on this species (p. 582. note ‡) are very interesting. — *T. K.* *Killalóe, Sept.* 21. 1832.

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* I do not know the botanical name of the plant which produces the seed so called by the English in India. The juice is deep black, acrid, and viscid, and is used as an escharotic, as well as for *marking* linen, and printing the black outlines of some Indian chintzes.

Instinct in the Martin (H*irúndo úrbica*). — Sir, In looking over my notes since I sent you a few observations on the birds of the swallow tribe [published p. 285.], I find the following additional remarks made during the last summer [1831], on a pair of martins which had commenced making their nest in the deep corner of one of my windows, which, being of French make, frame and all moved every time it was opened, and, in this case, inwards. The martins commenced, and persisted for many following days, to make their nest so close to the corner, that it became attached to the frame of the window, and, of course, the nest was carried away every time the window was opened; but so perseveringly did they adhere to the spot, and always recommence building early in the morning, that I could not make them desist from their fruitless labour, except by nailing up a piece of paper in the corners of the window. When this was done, they removed to the next window, and there, with wonderful sagacity, commenced and carried on the business of building their nest, out of reach of the motion of the window frame. We must all admire the *instinct* which enables various birds and animals to perform such wonderful and beautiful contrivances suited to their respective callings; but doubly admirable it is to see them exhibit such surprising thought and skill out of the common range of their habits. I am, Sir, yours, &c. — *H. B.* *Blois, France, April* 14. 1832.

Nests of the Swallow and Martin. — Many accounts have been given to us of the extraordinary situations in which the swallow at times has been known to place its nest. But none of these include a situation which, there is some reason to suppose, is not uncommon; but which has been unobserved, because beyond the range of the ordinary haunts of the naturalist. It is true, Forster, in his *Natural History of Swallows*, says, the martin builds in crags of rocks and precipices near the sea; but he confines the observation to the latter bird, to the exclusion of the swallow. In the autumn of 1831, I was informed that swallows had been seen flying in and out of a cavern, forming part of a steep and retired cliff, a little way west of the harbour of this place. I attempted, by inspection at the time, to satisfy myself as to this fact; but, being late in the season, the birds had disappeared before I was able to get any decisive proof. In the spring of the present year, I again attended to my observations; and soon ascertained that several swallows were employed in visiting the cavern, ascending to the roof, passing up through a crevice, and remaining there. This cave is not deep, nor higher from the floor than, perhaps, about 30 ft. When the tide is high, the station of the birds cannot be more than 10 ft. above the water; and in a storm, when the waves roll into the place, their situation must be dangerous. But neither when the tide was in nor out could I succeed in possessing myself of a specimen of a nest: which leaves, indeed, the actual proof of the matter still somewhat in question; but for which, I hope, a sufficient excuse will be found in the very evident danger of a broken limb that might have resulted from the attempt.

That martins build their nests in caverns near the sea, we have the authority of Forster; but, though the fact may require no further proof, it may admit of illustration from recent observation. Mr. Clement Jackson of East Looe informs me, that he knew a cavern near Falmouth where numbers of martins were accustomed to build their nests, the side of the roof being studded with them. What renders the circumstance more remarkable is, that, whilst these martins colonised the inner part of the cave, a pair of kestrels had taken up their abode, and were rearing their brood, under a projecting ledge at the entrance: neither party seemed to be incommoded by the neighbourhood of the other. High towards the top of a kitchen chimney, near to my house, are two cavities resembling pigeon-holes. For what purpose they were made I cannot say; they do not communicate with the interior of the chimney: but I observe that this year a pair of swallows are in the habit of flying into one of these holes, and remaining there. I think it, therefore, probable that they have formed their nest in this singular situation. — *J. Couch. Polperro, July*, 1832.

Habits of the Swift.— First seen, May 1st, 1824; April 30th, 1832; May 2d, 1820, 1823; 3d, 1827, 1828, 1829; 4th, 1830; 5th, 1819, 1825; 8th, 1817; 9th, 1826; 12th, 1831; 14th, 1822; 16th, 1821; 18th, 1818; 21st, 1830.— Last seen, July 29th, 1831; August 12th, 1818, 1819; 3d, 1825; 9th, 1816, 1821, 1822; 11th, 1830; 13th, 1824; 17th, 1823.

These dates refer to birds occupying the same nests. It is not long that swifts have frequented stations convenient for my observation. At first they were about two pairs, but they have now increased to four or five; and it is singular that, according to my observation, there is always an odd bird. All the colony come and go, usually, all together; and, unlike the swallow and martin, I have not seen any swifts on their passage, after our own birds have gone. However, the individual which I saw on the 30th of April was not one of our troop; for it flew alone, took no notice of the breeding places, passed up our valley, and disappeared. Our own birds were first seen May 5th. The swift grasps with its claws, in opposing pairs; not bending the toes, but straightening them, and bending the sharp nails very firmly under, just in the manner, in the latter respect, I have observed the buzzard to do; and the grasp of the swift is even stronger, in proportion to its size, than that of the bird of prey. Placed in a cage, the swift roosted upright against the side, holding by the wires. It ran along in all directions, and about the top, with its back downward, with the wings partly expanded. Its progress was very materially aided by the chin, which it fixed on the wires or bars, to lift itself forward; and without this, the feet alone were not adequate to climbing. The mandibles were not employed for this purpose. The individual here spoken of, flew through an open window into a house, and pitched on a boy's head; from whence it was taken without injury. Mr. C. Jackson informs me, that, according to his observations, in proportion to its size, the swift has a thicker skin than any other of our birds; and that land birds of cold climates have thinner skins, and more fat, than those of warmer regions. — *Jonathan Couch. July* 16. 1832.

The Creeper (*Cérthia familiàris* L.) *it is, and not the Nuthatch* (*Sítta europæ̀a* L.), *which associates with the Titmice in Winter, in Lancashire.* — J. D. gives me (p. 489.) no credit for accuracy of observation, in his supposing I could possibly mistake the nuthatch for the creeper, two birds so very distinct in size, shape, and colour. The nuthatch does not at all occur in this part, and I doubt if in any part, of Lancashire; but the creeper is very common, and is a bird with the habits and peculiar call of which I have been acquainted from my childhood. Your valuable correspondent Mr. Bree, who combines with accurate and extensive information an amiable and pleasant manner of communicating it, has not, I perceive by p. 489., witnessed the creeper's associating with the titmice in winter; at which I am rather surprised, and think, if the creepers are numerous in his neighbourhood, he will hereafter not fail to perceive them among the small flocks of titmice which associate through the winter. There are

Several Birds which appear common enough in the South that are not met with here [*about Clitheroe, Lancashire*]. — Among these are the bunting (Emberìza *M*ilià*r*ia), the nightingale, the woodlark, the nuthatch, the wryneck, and several of the warblers; and I shall feel particularly obliged to any correspondent who will supply any opinion or information on the causes which induce several species of birds to visit one district in great numbers, whilst another district, apparently quite as suitable to them, is entirely destitute of them. I am, Sir, yours, &c. — *T. G. Clitheroe, Lancashire, June* 30. 1832.

The Creeper (*Cérthia familiàris* L.), p. 489., is certainly resident in this country all the year round; but, according to Temminck, it is migratory in some parts of Europe. — *M. P. Dec.* 8. 1831.

Materials composing the Nest of the common Brown Wren (*Anorthùra communis* Rennie). — Mr. Rennie, in his edition of Montagu's *Ornithological Dictionary* (p. 574.), and also in his *Architecture of Birds*, after copying what I have said in your Magazine (Vol. III. p. 568.), in reply to what Mr. Jennings says [see our Vol. I. p. 344.] on the subject of wrens' nests being lined with feathers, says, "There can be no doubt, I apprehend, of those supposed cock-nests being nothing more than the unfinished structures of paired birds; otherwise the story would require the support of very strong evidence to render it credible." Mr. Rennie afterwards goes on to say, that in two instances he had seen nests which had about half a dozen feathers interwoven into the lining with hair; and Mr. Jennings, if I recollect aright, as I have not the work to refer to at present, says that wrens do not line their nests with any thing but moss; and he thinks Montagu is in error when he says that they are lined with feathers. Along with this, I send you three or four wrens' nests, which, you will perceive, have abundance of feathers in the inside; and although the wrens will occasionally use cows' hair along with the feathers, yet I am persuaded, from the localities in which I have met with them, that cows' hair has been used because feathers were not to be found: but when the nests are in the vicinity of a rookery, farm-yard, or any other locality where feathers are abundant, the wrens will use them exclusively. What the "strong evidence" must be, to convince Mr. Rennie about cock-nests, I do not know; but I know of a dozen of these nests at the present moment, several of which have remained *in statu quo* [in the state in which they were left] since the middle of April. Other nests, found about the same time, have now young ones in them. I do not doubt that these nests are occasionally used for breeding in: for instance, if the first nest of the wren be taken, or if it breed a second time, it will occasionally take possession of a cock-nest; as I have sometimes found, that, after remaining in the same unfinished state for several weeks, they have been fitted up with a lining, and bred in. Mr. Rennie asserts that Montagu is incorrect when he asserts that the wren always adapts its materials to its locality. Although it certainly is not *always* the case, yet it so very generally is so, that I think it is not surprising that Montagu made this assertion. Thus, if a wren build in a haystack, the front of the nest is generally composed of the hay from the haystack; if it be built on a bush by the side of a river, and (which is frequently the case) below floodmark, it is generally covered on the outside with the rubbish which has been left there by the flood; and if it build in a mossy stump, the front of the nest is composed of the dark-coloured moss which grows there. — *T. G. Clithcroe, Lancashire, May* 2. 1832.

T. G., in a subsequent communication, dated June 30. 1832, thus pursues this subject: —

Along with my last letter I sent some wrens' nests lined with feathers; and I could easily have increased them to a dozen of the same sort, only I did not wish to deprive so many of my little favourites of their eggs and young. Every day convinces me more decidedly that I am right, both with regard to the lining of the wren's nest, and as to the cock-nests also. The nests I send you will prove the former, and I know of at least twenty instances of the latter, in nests which I have known of all through the spring, from April to the present time, which have remained in the same unfinished state, although they are not forsaken, as I have found the birds in them in several instances when I have examined. I found one of these nests, on the 10th of April, under a bank on the side of the river; and I examined it repeatedly through April and May, and always found it in the same state, although there was always a pair of wrens about, and I could find no other nest; yet I am sure there must have been another; for, in the beginning of this month (June), there were some young wrens which had evidently only just come out of the nest, and there were only two or three bushes grew thereabouts; so that it is not probable they had come from any other quarter. But the bushes were filled with leaves and other rubbish brought down by the floods; and I suppose the nest had been built among this rubbish. However, when I heard them, I looked out for another nest, as I believe (notwithstanding that Montagu says, "It is few birds, if any, that would produce a second lot of eggs, in the same season, if unmolested") that most of the small birds, which are early breeders, build a second time, even when they succeed in bringing out the first brood. I have had proof of this (if any thing can be considered proof, except marking the birds) in the throstle, the blackbird, the wren, the redbreast, and the hedge sparrow, whose second nests may be found contiguous to the first; and, in point of time, this always happens just when the young have left the nest. The cock bird, too, who has been silent while his young were unfledged, begins to sing again; and, throwing off the anxious care-beset manners of a parent, he again assumes that of a bridegroom. But, to return to wrens' nests, I found one (within ten yards of the one I had known of since the 10th of April) lined and ready for an egg. As I was anxious to prove what I had so long believed, I pulled out this nest, thinking that the old one was ready for laying a second lot of eggs; and that, as she had no other nest ready, she would probably take up with the cock-nest. As it was half a mile from my house, I did not visit it again until the 16th of June, and was then delighted to find the old bird sitting on six or seven eggs in the cock-nest which had remained so long unoccupied. I believe, in this instance, there is very little lining in the nest, although I should be sorry to examine it closely until the young have left it; but I consider it an exception to the general rule, inasmuch as I believe the bird to have been ready to lay when I pulled out the other nest. As she would have to find another with as little delay as possible, she would not have time to embellish the inside in the same manner as she probably would have done, if she had had more time.

On examining another wren's nest one evening, a few weeks ago, I found the young ones had flown; and, as there was a cock-nest in some wrack left by the river in a bush a few yards off, I gave it a shake, to see if the old ones had taken possession of it for another brood; and I was surprised to see one, and then a second, come flying out, and a third putting out its head to reconnoitre. Whether the whole brood was there I do not know, as I did not disturb them further. As I had examined this nest only about ten days before, and it had nothing in, I was at first at a loss to account for it; but have now no doubt that they were the young from the adjoining nest, who had taken up their quarters for the night in the new house. But how had they learnt the way? Young birds generally roost where night finds them; and, if I had found only one, I should not have been surprised: but to find at least three, probably six or seven, in a nest where, I am certain, they were not bred, was something new to me. I went several times in the evenings after this, but never found them. I suppose the fright I gave them deterred them from lodging there again. — *T. G. Clitheroe, Lancashire, June* 30. 1832.

We have examined the wrens' nests sent: their staple materials are moss, feathers, and hair. Into the moss on the exterior of the nest are woven a more or less perfect, but feeble, frond or two, and separate pinnæ as well, of Aspídium *F*ílix más, and leaves of elm, apple, and oak trees. Interiorly, cows' hair is not scarce, and is partly inwoven with the moss and laces it together, and partly mingled with the feathers. A horsehair or two are also observable: the feathers, in each nest, apparently those of domestic fowls, are numerous enough to fill the hollow of the hand when the fingers are so folded over them as not to much compress the feathers. — *J. D.*

Remarks on the Figures given in Illustration of Two Papers on "Fishes new to the British Fauna," by Jonathan Couch, Esq. F.L.S. &c. (Vol. V. p. 15. 311. 393.) — In an editorship of five years' duration, the Conductor of the Magazine of Natural History has shown himself desirous of keeping to the truth of nature; and capable of bearing reproof with good temper, when fault has been found with any of his proceedings. In the confidence that the same good feeling will be exerted on the present occasion, I venture to solicit permission to find fault with the engraved figures that have been given to illustrate my "Rare fishes, new to the British Fauna." Without the following observations, they must not be quoted as likenesses of the individuals they profess to represent: —

Vol. V. p. 16. fig. 2. *Ciliàta glaúca.* The eye is represented too near the snout; the ciliated membrane on the neck is also too much like a fin: in fact, this organ, the use of which is doubtful, is a membrane edged with loose threads, which appear above the surface of the back. One of your correspondents [Professor Rennie (p. 299.)] objects to the word "midge" as a name for this species, on the plea of its being previously engaged in entomology; I have, therefore, no objection to substitute the term "mackarel midge," the name by which it is known to our fishermen.

P. 17. fig. 3. *Spàrus Erýthrinus.* This figure is not copied from my drawing; but it is, on the whole, a tolerable likeness. It differs from nature in being too much elevated on the back; and in wanting the semilunar mark behind each eye, common to this fish and the Spàrus auràtus.

P. 18. fig. 5. *Làbrus lúscus.* This figure is wholly unlike the object sought to be represented; and, by comparison with fig. 7. p. 21. (*P*érca robústa), I do without hesitation express my belief that the same original was copied to represent both these fishes. Fig. 5. is, indeed, a good likeness of *P*érca robústa; but how unlike what, in my MS., I have designated scale-rayed wrass, will appear from the figure of the latter which I now send (*fig.* 121.), and which accompanied my

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former communication, but which your draughtsman must have overlooked. [For the description see p. 18.]

P. 318. fig. 65. *Pellucid Ophidium.* A remarkable mistake has been made in the fins: the anal fin should have begun at about the middle of the length, and nearer the tail than the commencement of the dorsal fin. The body is much wider (deeper) at the vent than farther forward, and its termination at the tail much sharper than represented in the figure. From Wm. Yarrell, Esq., I learn that the fish here described and figured is the Lepídopus pellùcidus of Risso (*Ichth. of Nice*); but Lepídopus, or scale-foot, cannot be an appropriate name, as it has no free scale in place of a ventral fin. I entertain no doubt of its being the Leptocéphalus Morrís*ii* of Fleming (*Hist. of British Animals*, p. 200.); but it is sufficiently distinguished from the *genus* Leptocéphalus by the presence of a pectoral fin; which Pennant expressly affirms (both in his text and figure) to have been absent in his specimen. As a species also (even admitting the genus), it is sufficiently distinguished by the dorsal fin, which, in Pennant's fish, reached from *close on the head* to the tail; and failed at the latter part, not encompassing the extremity. I am the more desirous of preserving the genus Leptocéphalus distinct from all mistake or interpolation, as I possess a specimen (with a description and figure) of a species of Pennant's genus Leptocéphalus (distinguished particularly by the want of pectoral fins) that is hitherto unknown to naturalists. The generic character of this rare genus must be preserved for the reception of at least two British species: — "Leptocéphalus: Head small, narrow; body thin, compressed, no pectoral fins."

While on the subject of errors, I beg to show my respect to Dr. Fleming by pointing out some mistakes into which he has fallen in his account of the Linnæan genus *L*àbrus, now divided into the genus Crenílabrus and *L*àbrus.

C. *T*ínca *Flem.*, common wrass, *L*àbrus *T*ínca *Lin.*, Jago's fish; the goldsinny is made the same with this; whereas they differ in size, shape, colours, and habits, as I have innumerable opportunities of knowing. If " old wife " be also a name for the common wrass, the confusion will be doubled; for, with our fishermen, this name (old wife) is applied to the fish described by myself in the *Linnean Trans.*, vol. xiv. p. 79., and which Dr. Fleming rightly supposes to be the *P*àgrus lineàtus of Montagu. I cannot agree with Mr. Yarrell in his confident assertion that the *P*àgrus lineàtus of Montagu is the *S*pàrus *S*árgus of Bloch; at least, if the latter also is the *S*árgus of Ray (*Syn. Pisc.*, p. 130. 136.): in the latter, " totum corpus annuli transversi fusci distinguant, Percæ aut Mormyri in modum." [" Brown transverse circles ornament the whole body, in the manner of the perch or *M*órmyrus."] I never saw any thing like this in the numerous specimens I have examined, for hundreds of this species are taken in Cornwall every summer. Again: — " Aurea illa lunula inter oculos Auratæ propria caret: quod denique annulo nigro prope caudam Spari aut Melanuri instar insigniatur." [" It is wanting in the golden lunar mark between the eyes, which is proper to the *A*uràta; and, lastly, may be distinguished by a black circle near the tail, resembling that of a *S*pàrus or *M*elanùrus."] Our old wife never has a black ring near the tail; and it *does* possess the semilunar mark behind the eye, though not so nearly golden as in the *S*pàrus auràtus. The only marks or lines I ever saw on its skin are short, narrow, and longitudinal.

The British species of the genus *L*àbrus (of Linnæus) that are, beyond question, distinct, are the following: — Common wrass (*L. T*ínca), cook (*L.* còquus), three-spotted wrass (*L.* trimaculàtus), corkwing (*L.* gíbbus?), goldsinny (*L.* cornubiénsis), scale-rayed wrass (*L.* lúscus). The comber (*L. Cómber* L.) I have seen, but it is rare. Of the bimaculated wrass (*L.* bimaculàtus), yellow wrass (*L. I*ùlis), hog wrass (*L.* suíllus), ballan (*L. B*álanus), I am uncertain; of the greenfish (*L.* lineàtus), almost more than doubtful.

Description of the Jaws of the common Sunfish. — [As we have, at the end of Mr. Couch's second paper on fishes (p. 315.), added an account of the short sunfish (*O*rthagoríscus Mòla *Flem.*, Tétrodon Mòla of the older authors), we would here introduce a few remarks by Mr. Couch, on the common sunfish, which have long lain by us. The briefest remarks of so original an observer as Mr. Couch are too valuable to be lost. — *J. D.*]

Common Sunfish. — This fish is arranged in the Linnæan genus Tétrodon; but I have its jaws now before me, cleared by putrefaction from all the soft parts, and they are undivided, and end in an obtuse point. The jawbones are of a loose striated texture, but, where exposed in the recent animal, covered with a kind of enamel; and within this, in each jaw, are three or four rows of flattish teeth, loosely and rather irregularly placed. — *J. Couch. Polperro, June* 28. 1830.

A Contribution to the History of the Propagation of the Eel (*Muræ̀na Anguílla* L.) (p. 313.), *and Conger* (*Muræ̀na Cónger* L.) — Sir, I have lately read that very pleasing book Jesse's *Gleanings in Natural History* [briefly reviewed p. 374.], and I noticed in it some opinions that I consider erroneous, particularly those on the propagation of eels; and as you, p. 374., call attention to Jesse's opinions on this subject, I request a place for the following remarks: —

The author endeavours to prove that eels are viviparous; that the young are contained within the intestines of the parents; and that they are sometimes bred in freshwater ponds. I am convinced that all these notions are incorrect, although they have existed for ages, and have been countenanced by many celebrated men. These opinions exploded the more antiquated ones, that the creatures were bred from putrefaction of dead eels, from particles scraped off from living ones by their rubbing against rocks, from bits of horse hair falling into water, from dew-drops, and from mud of ponds and ditches animated by the sun's vivifying rays. The author of *Gleanings in Natural History* certainly mistook parasitic vermes [worms] for young eels; and as he was aware that similar creatures were found in other fish, I wonder that he did not try whether they would wriggle and swim about in water, as well as the little things did which he took from the intestines of eels. If he had done so, I assure him that he would have found them equally active and eel-like.

If any one will take the trouble to examine the fat-like fringe on the sides of the air bladder and kidneys of the eel and conger, he may, with a common pocket lens, and often without the aid of a glass, see an abundance of ova [eggs] from the beginning of the year to about September. I attended a good deal to the natural history of these fishes a few years ago, and I was then in communication with a very distinguished person (now no more), whose philosophic mind was much engaged on this subject, and whose information would have been highly valued by naturalists, if he had lived to give it to the world. The following extracts from a communication which I made to him in Feb. 1829, will, I think, be acceptable to many of your readers: they contain the result of much patient investigation: —

By examining every eel and conger that I could procure between March and September, I traced the growth of the ova [eggs] to their full size, and ultimately their exclusion; that is, I found them within the power of a common lens, becoming, by degrees, plain to the naked eye of common observers, and at last the ovaria emptied. In none of these could I find male organs; but in others I found parts which were like the ovaria in form and general appearance, but differing in consistence, growing in different specimens, as the season advanced, to a state of apparent *ripeness*, and not showing globular forms like the eggs at any time. I have no hesitation in believing that these were male organs, and that these fish are not hermaphrodite, but perfectly analogous to other fish in their mode of generation. The ripe ovaria of most fish are compact masses; but those of the eel and conger are two rows of transverse fringes fixed to, and nearly enveloped by, mantles which are attached to the sides of the air-bladder and kidneys; and, although each contains millions of ova, it is thoroughly flexible. This structure is admirably adapted to the vermicular motion of these creatures. I procured the first *shotten* congers early in September; they were then much darker than usual: some were so dark as to have the black margins of the fins obliterated.

The first common eel that I met with containing ova visible to the naked eye, was caught in July, in a stream which goes into the river Parrot; I afterwards had them from that river, and its estuary, in a more forward state. The shoals of elvers which appear in tide rivers, early in spring, are the young of the common eel. They make their appearance in the Parrot early in March, advancing, tide after tide, until they are out of the reach of salt water: fresh shoals go up in April and May. Having passed gradually from the salt to fresh water, they ascend the streams and drains, and spread themselves through the inland waters. I procured the fry of the conger on the 15th of March, from the rocky coast of Somerset. I believe that no eels breed in fresh water, that there are regular migrations of pregnant ones from inland to the sea, or to the mouths of salt-water rivers, at the end of summer, and of elvers from those situations to the fresh waters in spring.

It is not necessary to examine the largest eels and congers to see the ova; the former, of 1 or 2 lbs. weight, and the latter of 7 or 8, will do very well. It is strange that Sir Everard Home should have considered the eel and conger as the same species: the latter has thirty more vertebræ than the former. — *W. B. B. W. July* 28. 1832.

The remarks by Mr. Couch, p. 313., on this interesting subject, also merit studious attention. — *J. D.*

The Preserving of Insects selected for Cabinets. (p. 495. 683.) — I am obliged to Mr. Waterton for his kind and early attention (p. 683.) to my query (p. 495.) as to the best means of preserving insects, but I am not yet quite satisfied; for it is against the decay of the specimens, as well as "the deadly moth," that I am anxious to guard. Besides, I have found that the solution cannot be applied to the *outside* of most insects (especially Libéllulæ), without, in course of time, injuring their colours; and to apply it to every part of their *inside* is impossible. Mr. Waterton recommends to me patience and perseverance: this and his further advice (and no one can be more able or more willing to give it in this matter) will, I hope, enable me to succeed. — *M. P. Sept.* 8. 1832.

On the Preserving of Insects selected for Cabinets. (p. 683.) — Sir, In Mr. Waterton's valuable communication on the subject of "preserving insects selected for cabinets" (p. 683.), one of the methods he recommends is that of poisoning the atmosphere by means of spirits of turpentine, which may be put into a glass inkstand containing a piece of sponge, and placed in a corner of the box or drawer in which the specimens are kept. It does not appear quite certain whether Mr. Waterton recommends the above method on his own authority, after having made the experiment, and found it answer; for he says, "I am *of opinion* that the specimens will be safe," &c.; and, spirit of turpentine "*is said to be* the most pernicious of all scents to insects." I should feel obliged to this gentleman if he would have the kindness to reply, through your Magazine, to the two following questions: — First, Whether he has himself tried the experiment, and found spirits of turpentine effectual in keeping away living insects from dead ones, especially in expelling that worst of all pests, the *A'carus* destrúctor? — and, secondly, whether he does not find the spirit of turpentine to be itself prejudicial to the preserved specimens? My reason for thinking that it probably may be so is, that I have heretofore had a collection of lepidopterous insects that was kept in cedar drawers, entirely ruined, owing, as I conceive, to the strong effluvia arising from that wood (see p. 368.): still more, therefore, should I apprehend the same bad result from the use of spirit of turpentine. Corrosive sublimate, I have no doubt, would be of the greatest advantage in cases where it can be employed; it will have the effect of entirely preventing mould. I never open a fresh bottle of ink without putting into it a very small quantity of this poison. Should it be thought that this is a dangerous plan to adopt, as many are in the habit of sucking their pens, or applying them to the mouth, I answer, first, that this is a very dirty needless habit, which ought to be avoided; but, secondly, if it be persisted in, I still apprehend that no ill consequences can arise from the corrosive sublimate, of which the portion required is so very small. As much as would be taken up on the point of a fine penknife, or less than half the quantity that would commodiously lie on a silver penny, is amply sufficient for a pint bottle of ink; which, after having been so medicated, I have never known to become in the least degree mouldy, either in the bottle, or after it had been poured into the inkstand and exposed to the action of the air. Possibly, a still less quantity than I have mentioned would serve the purpose. A very minute portion of the poison I find also to be equally effectual in preserving paste from mould, when kept in a cup, &c.; and I have little doubt that it would equally preserve the same cement from the ravages of insects too; and thus render it a much better material than gum or glue, for the purpose of fastening down dried plants to the paper for a herbarium. I am, Sir, yours, &c. — *W. T. Bree. Allesley Rectory, Sept.* 12. 1832.

A Work describing the Genera and Species of Insects. (p. 686.) — Tyro is not singular in his desire (p. 686.) for such a work. Is it not a pity that Mr. Griffith has not given at least a *list* of all the known species of insects under each genus described in his *Animal Kingdom?* Perhaps, however, it is his intention to do so. — *Sigma. Saffron Walden, Essex, Sept.* 25. 1832.

Epeira diadèma. (p. 689.) — Professor Weber of Leipzig states that he watched a little spider as it was constructing its web between two trees. The three principal points to which it was attached formed, as usual, an equilateral triangle. The two upper threads were fixed to the trunks of the trees; but, not finding a point to fix the lower upon, the spider suspended from its extremity a little pebble, by way of counterpoise. The pebble, being heavier than the animal, kept the web perfectly extended.

Spiders. — A curious paper was lately read at the Paris Academy of Sciences, on the construction of a spider's nest in the earth. This spider is a native of Corsica. The nest is in the form of a well, 2 in. deep and 6 lines in width. The interior is lined with fine web, and the top is furnished with a kind of lid, with hinges, which shuts when the insect is in. This lid, which is composed of earth and web, consists of upwards of forty layers.

The above paragraphs have lain a good while by us: they were cut out of a newspaper (we believe, the *Cambridge Chro-*

nicle), and are inserted here because the first of the two paragraphs describes a fact parallel to those described by Mr. Spence. (p. 689.) — *J. D.*

A Species of Spider evincing remarkable Habits. — Sir, Having lately observed in this place a curious kind of spider, I herewith send you an account of it. It seems to inhabit a particular part only of the building; and very much resembles the small long-legged species found in our woods, only that the body of the one now alluded to is oblong, instead of round, as in the former. It appears always stationary in the day, is without any web, and is generally in company with a dozen or more individuals. It remains attached by its long legs always to the ceilings, near to the sides of the building. Its great peculiarity consists, when touched, in not moving, but immediately commencing a whirling motion, so quick, that it is quite impossible to see its legs singly. During this motion it never changes the position of its legs; their length and elasticity enabling it to continue this rapid whirling motion for two or three minutes without cessation, as I have noticed by my watch. If touched twice or thrice, it recommences this curious motion, but with reduced force, until at last it ceases it altogether. It is no doubt intended as a kind of defence against its more powerful enemies; for they may well be frightened by this very unusual appearance. They roam about at nights, no doubt, as I can never see them for two days in the same place. I am, Sir, yours, &c. — *H. B. Blois, France, April* 14. 1832.

It is to be regretted that our valued correspondent did not submit specimens of this interesting species to some naturalist competent to make known its systematic name. — *J. D.*

Spider's Thread. — The thread of the silkworm is so small that many folds are twisted together to form our finest sewing thread; but that of the spider is smaller still, for 2 drachms of it by weight would reach from London to Edinburgh, 400 miles. (*Bristol Mirror*, April 28. 1832.)

Ichneumons from a Pupa of Lasiocámpa quércus. — Mr. Bree mentions (p. 106.) once obtaining more than 48 specimens of a species of *I*chneùmon from a pupa of the Lasiocámpa quércus, and there remarks, "I herewith send you specimens." These we have recently submitted to Mr. Westwood's inspection, who (Oct. 13.) kindly replied: — "Mr. Bree's ichneumon is a species of Pímpla, but I cannot now tell the specific name. I have bred a species scarcely distinct, out of Trichiosòma lucòrum." Was the species which Mr. Woodward, in his communication on the Trichiosòma lucòrum (p. 85.), describes as destroying the pupas of that insect, identical with that bred by Mr. Westwood? A comparison of specimens will best determine. Will Mr. Woodward communicate winged ones? The cocoon of Trichiosòma lucòrum which he sent us this spring (collected in December, 1831), as being infested with ichneumons, is now full of larvæ, each enveloped in silky matter, but every one seems dead. — *J. D.*

Notice of some singular Varieties of Papiliónidæ *in Mr. Weaver's Museum, Birmingham.* — Sir, It is with pleasure that I observe, p. 546., a notice and account of the museum of natural history at Birmingham, which has been amassed by the indefatigable industry and perseverance of Mr. Weaver. I lately visited the institution, for the first time since its establishment, and was much gratified by what I saw there. In particular, the collection of British insects, which is beautifully arranged, appeared to me as one of the best and most extensive of any to which the public have ready access. It would be foreign to my purpose, if not superfluous, to attempt to give any thing like a full account even of this one department of the museum. The object of my present notice is merely to call the attention of entomologists to one or two singular varieties of *P*apiliónidæ with which the collection is enriched: these Mr. Weaver has intrusted to my care, and kindly allowed me to forward to you, for the purpose of being figured in your Magazine.

The first which I shall mention is an extraordinary variety of Argýnnis Adíppe? (*fig.* 122.), which was taken in Sutton Park, about five years ago. The anterior wings above are nearly black, " embrowned at the base," near which there is a bright, lunar, fulvous mark, and beyond it, more towards the apex a fainter dot of the same colour; a row of elongated tawny spots parallel with the hinder margin, extends from the apex. to the lower angle. The posterior wings approach more nearly to those of the ordinary examples; but are very much darker, having the spots and chequered markings less

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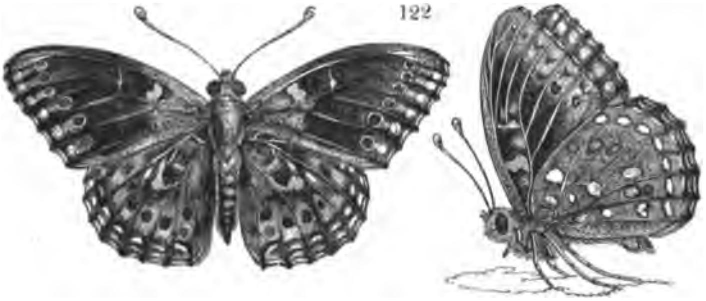
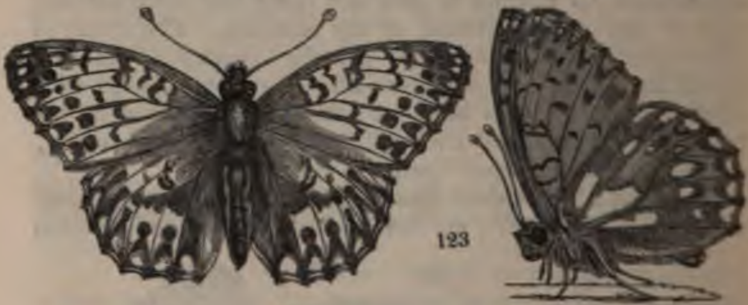


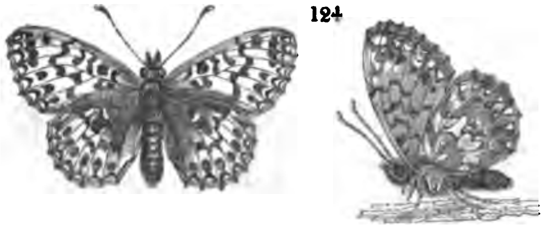
determinate, and running into each other. Beneath, on the anterior wings the black colour is predominant, except on the outer margin, which is tawny; the lunar fulvous mark is also apparent. The posterior wings are of a brown green, with numerous silver spots, of which four in "the second series from the margin are tarnished with black." The metallic spots are much smaller than in the ordinary specimens. I believe this is the identical specimen alluded to by Mr. Stephens in his *Illustrations* (see Addenda to *Haustellata*, vol. i. p. 147.); and of his description I have in part availed myself. I should have been in doubt, and indeed, still am so, whether this insect ought, with more propriety, to be called a variety of A. Adípp*e* or of Aglài*a*. Owing to the prevailing green tint of the posterior wings beneath, I should have referred it to the latter; as Mr. Stephens, however, has pronounced it to be of the former species, I yield to his better judgment.

Fig. 123. I conceive to be that variety of Argýnnis Aglài*a*, which has been published by various authors under the name of Charlótt*a*: it differs from Aglài*a* principally in having "the six basal silver spots on the under side of the posterior wings united into three larger" elongated "ones." (Stephens's *Illustrations.*) In the present specimen, which was taken, Mr. Weaver informs me, in the neighbourhood of York, five or six years since, the black spots and markings on the upper side of the posterior wings are less distinctly defined than the corresponding ones in the anterior pair; being somewhat clouded and confluent. I have not the means of comparing this with other specimens of Charlótt*a*: should the insects so named be all of them varieties of Aglài*a*, probably no two examples may exactly correspond with each other.



123

Fig. 124. is a very interesting insect, allied to Melitæ'*a* Selèn*e*; of which, perhaps, it may be only a variety. Mr. Weaver possesses two specimens, both of which were taken in Sutton Park: one about ten years ago; the other, not



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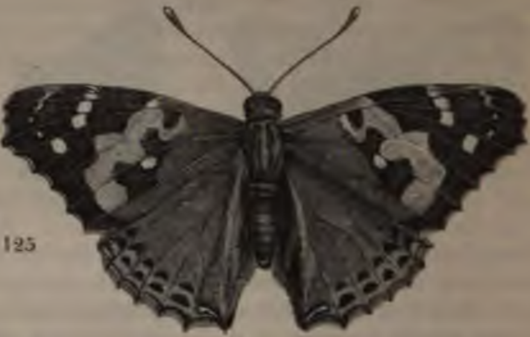
more than five or six. It differs from M. Selèn*e* in being rather smaller, and having the black spots and characters on the upper surface of both pair of wings larger and stronger, so that the whole assumes a darker appearance than that insect. But the principal difference consists in the under side of the posterior wings, which are of a brownish purple, interspersed with darker markings of the same colour, and numerous irregular semi-metallic spots; a row of which borders the posterior margin. I would invite the attention of entomologists to this insect, which deserves minute investigation. As Mr. Weaver has taken two examples of it in the same place, in different and distant seasons, it may possibly prove a distinct species; but, for the present, I would refer it to M. Selèn*e*, of which it is at least a very strong variety.

Fig. 125. is a foreign insect, which Mr. Weaver received in a collection from the Himalaya Mountains. It strongly resembles Vanéss*a* Atalánt*a*; or, rather, is intermediate between that species and Cýnthi*a* cárdui. I believe it to be the same, or nearly so, with that to which I formerly alluded (see p. 334., note §), as in the cabinet of my friend, Mr. Haworth: I speak doubtfully, as it is difficult to carry nice distinctions in the mind's eye. Our present insect certainly approaches V. Atalánt*a* much more closely than it does C. cárdui. From the former it differs in having the transverse band of a less brilliant scarlet, and much more irregular and interrupted, and in this respect resembling the corresponding band in C. cárdui; the white spots, also, at the apex of the anterior wings, are smaller than those of Atalánt*a*. The posterior wings are of a dark sooty brown (not black), with the scarlet border narrower, and a double row of larger black spots, besides those on the cilia. Beneath, the posterior wings are paler than those of Atalánt*a*; and here again the insect approaches C. cárdui in the marbling towards the base, and the ocelli (which, however, are more obscure) near the margin. The under side, indeed, of the posterior wings is exactly intermediate between those of the two species with which I have instituted a comparison. From both, however, this



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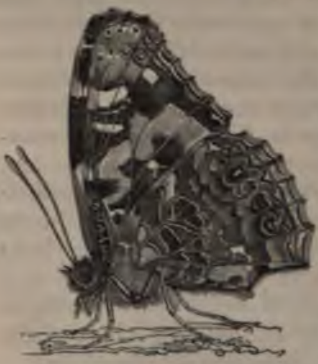

Himalayan admiral is undoubtedly distinct; and it is interesting, as showing the nice and beautiful gradations which nature makes between one insect and another; borrowing (if I may so speak) certain characters respectively from each of two nearly allied species, in order to make up a third distinct from either; and thus ringing the changes, as it were, with colour, markings, &c. Linnæus long ago said, "*Natura non facit saltus,*" — Nature does not take leaps; — and the aphorism is beautifully exemplified in the above instance.

Among the insects which I have said Mr. Weaver received from the Himalayan Mountains were specimens of *P*apílio Machào*n*, differing, so far as I can perceive, in no respect from European examples. The specimen which he kindly lent me for inspection is rather smaller, and has the colours less brilliant, than some British specimens of Machào*n* in my possession. I mention the occurrence of this insect in the interior of India, to show how widely the species is distributed through different parts of the world.

Besides the varieties of *P*apiliónidæ above noticed, I observed in the Birmingham museum the white variety of Còlia*s* Edùs*a* (see p. 332., fig. 72.), taken, as I was informed, near York; also a copper allied to Lycæ`n*a* díspar, but smaller, which may perhaps prove to be a distinct species; but, not having it in my possession, I cannot attempt to describe it from mere recollection.

Ranged among Mr. Weaver's British insects are several specimens of Còlia*s* Európom*e*, which, no doubt, are of foreign origin, palmed upon him as indigenous; he has no knowledge of the place or time of their capture.

In conclusion, I would strongly recommend such of your entomological readers as may have the opportunity, to pay a personal visit to the Birmingham museum, which, if I mistake not, will afford them a considerable treat. Mr. Weaver deserves well of the scientific world and the public at large; and I sincerely hope that his enterprising spirit will meet with its due reward Yours, &c. — *W. T. Bree. Allesley Rectory, July* 17. 1832.

Names of Vanéssa urtìcæ and polychlòros erroneously applied. — At p. 574. there is an error which should be corrected, viz. " the tortoise-shell butterfly (Polychlòros urtìcæ)," and again, " a full-sized Polychlòros urtìcæ." I suppose the writer means Vanéss*a* urtìcæ, which is the small tortoise-shell butterfly, as Vanéss*a* polychlòros is the large one. " Polychlòros urtìcæ," therefore, is nonsense, unless (which I *hope* is not the case) these two insects are new christened by the generic name of Polychlòros. — *W. T. Bree. Allesley Rectory, August* 21. 1823.

Hermaphrodite Argýnnis Pàphia. — Sir, The notices of hermaphrodite insects, in Vol. IV. p. 150. 434., induce me to mention that I last year took a specimen of Argýnnis Pàphi*a*, the right wing of which was marked like that of the male, and its left wing like that of the female. Yours, &c. — *Thomas Allis. York, 27th of the 6th month (June),* 1832.

The Brimstone-coloured Butterfly (Gonépteryx rhámni), Dates of its appearing. (p. 595.) — This was once seen by Mr. Bree, on the wing, on the tenth day of March, 1826, see p. 595. This year it was seen here on the 18th of January, and again on March 8th. In 1831 I saw it with the early white butterfly (Pónti*a* Chariclè*a*, on Feb. 10. In 1800, my first notice of it was on March 24. — *Sigma. Saffron Walden, Sept.* 25. 1832.

Tórtrix viridàna (p. 670.) *at Saffron Walden.* — We have had here, this season, great numbers of the Tórtrix viridàna, but they have not committed such extensive depredations as mentioned by your correspondent, C. P., p. 670., so far as I have noticed. — *Id.* [See Haworth's *Lepidopt. Brit.* — *J. D.*]

Corollas perforated by Bees. (p. 86.) — On the 28th of June, 1832, I witnessed in the horn-shaped nectaries of the blossoms of heartsease, that most of them had a small circular hole bitten out of them near the extremity where the nectar is lodged; and, early in June, I also noticed that the horn-shaped nectariferous petals of the columbine had been very generally perforated as Dr. Withering has observed them to be, as stated p. 86. — *J. D.*

Chélifer cancröides, a Lobster-like Insect, parasitic on the Common House-fly (*Músca doméstica* L.). — As the gentlemen who have so obligingly answered (Vol. IV. p. 283, 284. 479.) my query (Vol. IV. p. 94.), partly seem to think that the fact of this insect's attaching itself to the fly's leg was accidental, I have now to state that on the 17th of last month (July, 1832) I saw a similar insect in a similar situation. I have erred, in Vol. VI. p. 94., in calling the fly *Músca* carnària; it was the *M.* doméstica, or common house-fly. As I have in the course of a few years thrice captured this insect when attached to the leg of the house-fly, there can be but little doubt that it is a parasitical insect, and exists by extracting the juices of the fly. — *O. Clapton, August* 30. 1832.

Kirby and Spence mention (*Introd.*, vol. iv. p. 229.) that the Chélifer cancröides "occasionally is parasitic upon flies, especially the bluebottle fly (*Músca* vomitòria). They adhere to it very pertinaciously under the wings; and, if you attempt to disturb them, they run backwards, forwards, or sideways, with equal facility." — *J. D.*

The Flying Leech (Vol. II. p. 368.) mentioned by Heber is not peculiar to Ceylon, but is almost equally common and noxious, during the rains, in the mountain jungles of the Malabar coast on the continent of India. I never saw them attempt to spring; but they certainly (I speak from experience) contrive to fix themselves most dexterously on the legs of men and horses, even when moving on at a smart pace; their bites often occasion very bad ulcers. For "Canely" read "Candy." —*A Subscriber. Vale of Alford, Sept.* 28. 1832.

The Blood-red Zoophytes appearing in patches in the mud of the canal at Bury St. Edmunds (see p. 387.) are no unusual occurrences. I recollect having been taught, when a very little boy, to amuse myself by observing these creatures; and gently agitating the water, or shaking the earth, in order to make them retire beneath the mud and disappear. The animal is very common, and may be met with, as J. D. observes, in almost any situation suitable to its nature and habits. It might be worth while to give a figure of it in your Magazine, together with its name, and a more full description. — *W. T. Bree. Allesley Rectory, May* 10. 1832.

For these we shall feel grateful to any correspondent, and will publish them with pleasure. This animal (for a creature so sensitive should not be called a zoophyte) is profusely abundant in the mud on the margins of the Thames, at least I found it so beside Cheyne Walk, Chelsea, in the rainless ning of the otherwise rainy day, August 5. 1832. Cheyne vated 6 ft., and in some places more, above the mud of the Thames, from which it is built up by a wall of bricks, near to which wall the walk is skirted by a row of trees, whose branches hang partly over the river. When I passed by, the tide was down, and the mud left bare to the breadth of five or ten yards, on which the animals in question so abounded as to give the mud quite a reddened hue. Although rain was not then falling, drops of water were dripping from the arch-spread arms of the trees above, and, as these drops struck the mud beneath, the red tentacula were withdrawn from circular patches of from 12 to 18 in. wide, but as soon as the jar had subsided, a minute or so afterwards, they were again exserted. As the falling drops were not few, and fell on the mud in various and ever-varying places, a very interesting and pleasing changement in the degree of redness was observable,

> " The checker'd earth seem'd restless as a flood
> Brush'd by the wind, "

as a poet, not curbing his imagination, might say. — *J. D.*

Pàris quadrifòlia and its Variations. (p. 429.) — I have been much pleased with Professor Henslow's ingenious remarks on this favourite plant (p. 429.), and feel obliged to him for his theory connecting the genera Pàris and Tríllium which have so singular a numerical character in their leaves and fructification. It gives me pleasure to be able to add one more to his thirty-eight varieties, viz., one with eight leaves and four sepals, petals, and stigmas. It was found in Cotterill Clough, Cheshire, the only locality for Pàris within twelve miles of Manchester. I frequently meet with it with five leaves, less frequently with three, and, in the latter case, almost invariably without inflorescence. Some young friends of mine transplanted a few roots, but had the mortification to find that the flowering stems degenerated into the barren trifoliate variety. Indeed, I have remarked that the latter is always smaller than the other varieties, and apparently the shoot of a younger plant. — *William Thomson. Manchester, June* 14. 1832.

Pàris quadrifòlia, a Fault in the Figure of. (p. 430. fig. 86. *a.*) — The stamens are represented exactly like the stigmas, while in nature they are quite dissimilar: this was my fault, in not sending you a drawing to copy from.—*J. S. Henslow. June* 14. 1832.

Do the Leaves of the Round-leaved Sundew (*Drósera rotundifòlia* L.) *possess Irritability?* (p. 491.) — Without any claim to the degree of acquaintance with the habits of the round-leaved sundew ascribed to me by J. D. (p. 492.), I may yet, without too great presumption, so far accept his challenge as to express it as my opinion, made with all deference to that of others, that the leaves of this little plant are not possessed of the slightest claims to irritability. That they have the power of retaining any small insect that may happen to touch their upper surface is undoubted; but this seems to arise solely from the clammy nature of the liquid that exudes from the glands at the extremities of the hairs with which the most exposed sides of the leaves are covered. When touched with the finger, this moisture is so viscid, that it will draw out into threads of more than an inch in length; and it is not likely that an insect once touching a leaf, and becoming entangled, as it were, amidst the globules, should ever be able to effect its escape. In fact, as I have seen, by placing a minute fly on the surface of a leaf, every struggle, by rendering the parts of its body more clammy with the moisture, does but make its extrication more impossible. In respect to the hairs themselves, I did not observe any thing like movement, or a spontaneous attempt to capture their prey. Were the leaves possessed of any degree of irritability, would it not be made manifest to us on our applying any thing to their surface, in the same manner as we see the stamens close around the pistil of the berberry, on the flowers being touched with the finger; or should we not at least observe it when an insect is struggling amidst the hairs? In such cases, however, no movement is perceptible. An admirer of the little Drósera, I cannot help regretting that its leaves should be so constantly disfigured with the dead bodies of insects, which give so otherwise pretty a plant a somewhat revolting appearance; but most probably their being so answers some purpose in the economy of nature, or, rather, of the all-wise Director of nature, although I can hardly think it is that of affording nourishment to the plant. Perhaps it is but in accordance with the law that causes one thing to prey upon another, that nothing may become too abundant; and the little Drósera is thus made an agent of a destruction useless to itself, but subservient to the general good.

Although I may have already said more than sufficient, I cannot conclude without mentioning the extreme beauty of the leaves of Drósera rotundifòlia when placed beneath a microscope. The looseness of their cellular tissue, glistening like gold, the crimson hair, each tipped with a knob of the same rich colour, from which exudes a clear white liquid, would render them objects well worth examination, without the additional interest of some poor insect struggling in vain to effect its release. — *C. P. Surrey, June 5. 1832.*

Drósera rotundifòlia, its Leaves possess Irritability. — J. D. (p. 491.) in reply to J. E. L. (Vol. IV. p. 135.) doubts the irritability of the glandular hairs on the viscose leaf of this plant, and justly ridicules the newspaper nonsense about feeding its voraciousness with beef. I have observed this, as well as Drósera ánglica and D. longifòlia (which are plentiful in our neighbourhood), and can safely affirm that it has as decided an irritability as the far-famed Dionæ`*a* Muscípula. It is quite possible that the glutinous matter on the tips of these hairs, which has gained the plant its classical appellation of sundew, may be principally instrumental in detaining the venturous insect; and that this may be of a poisonous quality, destructive especially of insect life; but such a supposition will not, alone, account for the circumstance, that when an unfortunate fly has got into the centre of a leaf of Drósera, *every* hair turns inward, and remains curled in till the prisoner is not only *dead*, but *entirely consumed*, and then the disc, which before was extremely contracted and cone-like, expands to its fullest breadth, and the hairs again become erect. No other hypothesis, I think, will account for these phenomena, which I have witnessed many times, except the irritable power of the plant. The leaf of Drósera ánglica, when a fly settles on it, becomes rolled up circinally, and remains in this form till the animal is dead. — *William Thomson. Manchester, June* 14. 1832.

Drósera rotundifòlia. — In support of my ascribing (Vol. IV. p. 135.) a faculty of irritability to the glandular hairs on the leaves of Drósera rotundifòlia, I have the remarks of Mr. Gordon (Vol. V. p. 26.); and Smith, in his *English Flora*, vol. ii. p. 122., — " these hairs," says Smith, " have been thought irritable, so as to contract when touched, imprisoning insects, somewhat in the manner of the American Dionæ`*a* Muscípula *L.*, a plant allied to Drósera." The *Encyclopædia of Plants*, p. 233., states, that the leaf hairs of Drósera rotundifòlia are very irritable. I confess I have never been able, except very slightly, to excite the contractility questioned, but this might arise rather from an improper application of the stimulus than from absence of the faculty; but when I pressed the centre of a leaf with any substance, there was, in certain cases, a manifest inclination of the surrounding hairs to close over it, although I met with no decisive instances. I must mention, that in no case did I find any object upon the leaf; but observed that the hairs were curved inwards, so as to form with their globules a group over the centre of the leaf. On old leaves the centre is generally bare of glandular hairs, and the leaf perfectly flat, while the outer hairs alone remain, are unbent, and without any liquid in the minute globules with which they are tipped; as if by some strong excitement their energy had become weakened. — *J. E. L. Richmond, Yorkshire, August* 4. 1832.

The Flowers of Drósera rotundifòlia L. *expanded.* (p. 110.) — In reply to C. P. (p. 110.), I may quote the assertion of Linnæus, in his *Flora Suecica*, No. 273., which is thus expressed: — " Flos mense Julio evigilat hora ix.; clauditur hora xii. ante meridiem:" " the flower appears in July, and opens at nine in the morning, and shuts at noon." Linnæus is right, as I have proved in the following manner: — I had gathered the plant many times for three successive years at Lechley Car (the habitat of the rare Scheuchzèr*ia* palústris *L.*), as well as three times this year on a moor near Richmond; but, like C. P. (p. 110.), I had never seen an expanded blossom, owing, in my own case, to my not having visited the habitat of the plant at so early an hour as those mentioned by Linnæus, although, I believe, I have once observed expanded flowers on Drósera longifòlia. To facilitate observation, I transferred from their native abode into pots, in my garden, plants of the Drósera rotundifòlia; and on July 26., at half-past ten o'clock in the morning I perceived a single flower fully expanded, and at one o'clock the flower closed, as did also four flowers which expanded on the following day, July 27. The divisions of the calyx, when viewed through the microscope, appear extremely cellular, like the leaves and capsules of mosses; the bracteas also taper into a fine thread-like point, which is tipped with a gland. I suspect, but am not certain, that each blossom expands but once, and that only when the sun shines. In Lindley's *Synopsis*, the styles are stated to be from three to five in number: they are, I believe, always six. In the *Encyclopædia of Plants* (p. 233.), Drósera rotundifòlia (fig. 3941.) is figured with flowers expanded; all the old herbalists figure it with flowers unexpanded. — *J. E. L. Richmond, Yorkshire, August* 4. 1832.

The Scent of Anemòne *nemoròsa* L., *and Peculiarities in the Scent of some other Flowers.* —

> " Thickly strewn in woodland bowers,
> Anemones their stars unfold."

Sir, That beautiful little plant, *A*nemòne nemoròsa, which studs over the whole surface of the woods in this neighbourhood with its lively white blossoms, is now in full perfection. I have been looking, with some degree of interest, for the unfolding of its flowers this spring, in order to put to the test a remark of Mr. Turner (Vol. IV. p. 442.), who states that " the blossoms of *A*nemòne nemoròsa are very fragrant, so much so, that a wood in which it abounds is as fragrant as a bank of violets." * On trial, however, I cannot perceive that the blossoms possess any fragrance, though the leaves, when slightly bruised, appear to me to emit a faint smell of cucumber. In stating this, however, I am far from meaning to call in question the accuracy of Mr. Turner's observation; and must remark that the circumstance of my not being able to perceive any fragrance in the blossoms of the wood anemone is no conclusive proof that they are destitute of scent. For there are some plants whose flowers prove highly odoriferous to particular individuals, while, to others, who yet are not deficient in the ordinary sense of smell, they appear perfectly scentless. Of this kind is the well known Persian iris (*I'ris pérsica L.*), which ornaments our borders in the spring. I remember, as a boy, that a friend of mine was so partial to the odour of this plant (which he said resembled that of violets), that he was in the habit of growing the roots in pots, and placing them in his study. To these specimens I have repeatedly applied my nose, but never could perceive in them the slightest scent, though my friend assured me they perfumed the whole room. The circumstance, too, has lately been brought to my recollection, of a lady, who disliked the odour of violets, ordering a pot of the Persian iris to be removed out of the room, because she could not bear its powerful scent. And, as a further corroborating instance, I extract the following from a letter I have just received from a lady, whose attention I had called to the subject, and who resides near town, and takes great delight in her garden. " I bought," says my correspondent, " a pot of Persian irises at Colvill's, and perceived the scent of them as I brought them home, on the floor of Mr.——'s open carriage; neither he nor Lady —— could smell them. When I got home, my little boy, who met us at the door, exclaimed, " How sweet! they smell like a bunch of violets." I think their fragrance is strongest in the sunshine. Purposely, with a view to try the experiment afresh, and with a new individual specimen, I last autumn bought a root or two of the Persian iris at Messrs. Noble's shop in Fleet-street, and planted them in a pot. They produced flowers this spring, which, as usual, appeared to me to be entirely scentless. Out of about ten

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* There is a general and delightful fragrance (let it arise from what it may) very perceptible in woods at most seasons of the year, and particularly in spring, which can hardly fail to have attracted the notice of those who are at all conversant with woodland districts. May not this sylvan perfume, with which the whole atmosphere of the wood is charged, have been too hastily attributed by Mr. Turner to the copious blossoms of the wood anemone?

[illegible] the plant, six pro[illegible] of odour, and four that it was [illegible] that the scent was [illegible] perceptible. This plant, [illegible] differently styled, either [illegible] odoriferous, according [illegible] different persons to [illegible] submitted. Possibly [illegible] wood anemone. The above [illegible] be put to further test by [illegible] correspondents, and the results of their experiments [illegible] Magazine. I may add, that a near [illegible] smell in general was acute [illegible] the honied blossoms [illegible] there are some other [illegible], at this moment, I [illegible]. I am, Sir, yours, &c. — [illegible] 1832.

[illegible] power of olfactory per[illegible] individuals, call instantly to [illegible] differences in visual perception [illegible]. Two very interesting [illegible] perception are recorded in [illegible] Journal, in an article en[illegible] cases of insensibility in [illegible]" — *J. D.*

[illegible] Dictámnus *Fraxinélla* L.). [illegible] — The [illegible] remarks were intended to accom[illegible] Mr. D[illegible]ston's Chit-chat (p. 504.), [illegible] inspecting some fraxinella [illegible] late for insertion at p. 507.: —

[illegible] peduncles, pedicels, calyxes, [illegible] the filaments in the upper third of [illegible] over the whole of its surface, are [illegible] dark-hued somewhat orbicular glands or [illegible] aromatic oil or resin, and seated on a [illegible], and tipped by a short and slender [illegible] interesting subject, the combustion supplied by [illegible] flowers of this plant on applying the flame of a [illegible], my experience has been limited; but my [illegible] have left me impressed that it is not a gaseous exhala[illegible]nds the flowers, which is ignited, but particles of

hich the heat of the day has caused to trans-
ucts or glands already mentioned. I have
ure combustion only by direct contact of the
ith some of these glands; and combustion

followed both when this contact was made at the bottom of some spikes, as well as when made at the top of others.

This plant, so prized an ornament of the hardy garden, it is to be regretted, after it has been transplanted rarely acquires its former health and vigour till two or three years have passed. This declension may be prevented by transplanting the plant as soon as its leaves turn yellow (at the end of August, or early in September), and by observing to not needlessly divide, fracture, or mangle any of its thick, deep-striking, somewhat woody roots. Fraxinella is meant to express that the leaves of this plant resemble those of the ash (*Fráxinus*), and this they do sufficiently to render the term fraxinella, little ash, not inappropriate. — *J. D.*

The Custard Apple (Anòna) (Vol. I. p. 439.) is said to be "indigenous to the Caribbee Islands, to grow in Africa and Malabar, and to have also succeeded in the Island of Madeira." It is, however, a native of India, and is found wild, in vast abundance, on the rocky granite hills and tracts of the southern parts. In the Hydrabad territories, its fruit has, in seasons of famine, afforded sustenance to the inhabitants; and, therefore, the government of that country prohibits its being cut down for firewood. — *A Subscriber. Vale of Alford, Sept.* 28. 1832.

Sir John Byerley's Theory of verifying Dates by Calculations on the Precession of the Equinoxes. — Sir, It appears to me that your correspondent, Sir John Byerley (p. 174.) entertains too exalted an opinion of the accuracy of our early ecclesiastical architects, by presuming that they laid out the longitudinal line of the churches to be constructed due east and west with astronomic precision. There is a paragraph in the *Antiquarian Repertory*, vol. i. p. 72., said to have been penned by Captain Silas Taylor, author of the *History of Harwich and Dover Court*, passing under the name of Dale's *Harwich*, which states that " in the days of yore, when a church was to be built, they watched and prayed on the vigil of the dedication; and took that part of the horizon where the sun arose *from the east*, which makes that variation, so that few stand true, except those built between the two equinoxes." In order to prove this, I measured, with a magnetic needle enclosed in a square box, twenty-four of the churches in Norwich, applying the compass to different parts of the same building, and taking the medium result; and I found, that, so far as regards Taylor's theory, not one of those I measured agreed with the sunrising of the day of the saint to whom it was dedicated. I can assure Sir John that those measured vary in their lines of longitude 45 degrees; the greatest deviation from the true east and west being, towards the north 24°, and to the south 21°. — *S. Woodward. Norwich, March* 1. 1832.

Luminous Appearance on the Ears of a Horse. (p. 111. 400.) — I feel thankful to your correspondents for the notice they have taken of my communication on this *head*, though I believe I may say (without a pun *prepense*), that they have left the subject as dark as they found it. J. S. H. indeed charges the Scolopéndra eléctrica with the incendiarism; but, with all deference to an authority, which, if I can spell aright, is of first-rate respectability, I fear he has missed his mark; and for this reason, I hardly think it possible for the insect to have crawled on the parts where I observed the track of phosphoric fire (not *flame*, as stated by W. L.), namely, the outer edges and tips of the horse's ears, even had the weather been fine and calm; but not Tam o' Shanter himself turned out in a worse night —

> ' The wind blew as 'twad blawn its last;
> The rattling showers rose on the blast:" —

in short, Sir, no *insect* could have stood it. Besides, we learn at p. 368. that " it is seldom roused during the night." Strange, too, that if it were this insect, I should not have noticed it till after I had ridden full eight miles *in the wind and rain.* I remember more than once the occurrence of a somewhat similar appearance in Lancashire. On the road-side, between Liverpool and Allerton, I observed a considerable body, *not a mere track*, of this phosphorescent appearance. If it had been a speck here and there, I should have supposed them to be glowworms, and passed on; but such a conglomeration of light could not, I knew, proceed from *this* cause. What, then, could it be? I dismounted from my horse, and, after groping about for some time (it was very dark, and very wet to boot), I succeeded in capturing all the light troops, in the shape of — would you believe it? — two or three lumps of old touchwood! On I rode with my prize, and safely *alighting* at my then domicile, the old hall, Allerton, (the recollection of that hall how sacred to me, and to many a one besides me!) I deposited it safely in a dark parlour, and instantly mustered the family to see what they imagined were glowworms; nor, delighted as they were thus to behold them, could some of my young friends refrain from hinting a gentle reproach at the inhumanity of bearing the poor things away from their natural *habitat.* The light of a candle, however, soon banished their fears, though it added no little to their surprise, after the closest examination, to discover nothing more than a bit or two of old, wet, decayed wood. It was perfectly unaccountable to them, and, I own, not less so to me; nor did the similar phenomenon I witnessed several years after, on my horse's head, when riding between Norwich and Bungay, throw any light upon its cause and origin. One thing was common to both cases, the weather was very wet, and had been so for some time. I cannot help thinking that electricity had more to do with it than an insect; but all is vague conjecture, and one would like a better foundation than this to build upon. — *S. T. Stokeferry, June* 8. 1832.

The luminousness of touchwood is familiar to country folks, as it was also to Sir Walter Raleigh. See his "Lie." — *J. D.*

Luminous Appearance on the Ears of a Horse. (p. 111. 400.) — The explanation of this "puzzling occurrence" (p. 400.) reminds me of the following circumstance, related by Professor Silliman, in his *Journal of Science.* "The late Mr. Whitney of Newhaven, when riding on horseback, near East Rock, in the vicinity of that town, during a night thunder storm of great severity, was astonished to find all at once his horse's ears tipped with fire. He alighted, but now discovered the same phenomenon at the end of his whip, stirrups, and every prominent object. His own person, and that of an attendant, were tipped in the same manner." In this case it appears to me that a stream of electricity played around the two horsemen, and became attracted by the most prominent points of the group. In classic story we find an almost parallel phenomenon, which, among the superstitious ancients, invested the principal actors with divine agency. I allude to Castor and Pollux, around whose heads, in a violent storm, during the Argonautic expedition, two flames of fire were seen to play, when the tempest ceased and the sea was becalmed. From this occurrence their power to protect sailors was more firmly credited, and the two before-mentioned flames (such being not uncommon in storms) have since been known by the names of Castor and Pollux: when they both appeared, it was a sign of fair weather; but, if only one was seen, it prognosticated storms, and the aid of Castor and Pollux was consequently invoked. The electric current would, doubtless, flash with great intensity on the metal helmets of the heroes, and, on this account, the Romans believed the twins to head their armies, with a star glittering on their heads. Perhaps your clever correspondent, Mr. John Murray, may be induced to *throw some light* on this curious circumstance, in connection with his ingenious theories of atmospheric electricity. — *John Timbs.* 5. *Lyon's Inn, London, May.* 4. 1832.

Luminous Appearance on the Ears of a Horse (p. 111. 400.), *and Facts on the* Lampyris *noctilùca.* — May not this phenomenon be solved by attributing it to the presence of the male glowworm? A friend of mine some years ago related to me the astonishment he once felt, in riding across a moor in Somersetshire, in seeing a light flitting about his horse's bridle, and advancing as he advanced for a considerable distance. About a month ago, one of my domestics observed a soft and beautiful light (flame as he conceived) flitting in a field adjoining my residence. I have no doubt it proceeded from a male glowworm, and I have this year traced the *Lampy̆ris noctilŭca*, both male and female, through all its stages. In the larva state, both male and female emit their light from two points near the extremity of the end of the body; in the nymph state the light is also, although more feebly, displayed. On emerging to its perfect state, the female emitted light from eleven points, but most brilliantly from two, and the male from two only. Within the last six weeks there has scarcely been an evening when my study windows have been open, in which a male glowworm (and sometimes three or four in the course of the evening) has not flown in; all of them exhibiting their light, either voluntarily or on being excited by meddling with them. I had two or three female glowworms on a turf under a receiver in one corner of the room, and it is not improbable that sexual instinct was the occasion of my being so numerously visited. The male glowworm I have observed to live from two to four days after introduction to the female; and the latter to survive ten days or a fortnight, having laid a vast number of eggs. — *Albert. July* 12. 1832.

Of Winds. (Vol. II. p. 175.) — Mr. Main, speaking of the trade winds blowing constantly from east to west, says: — "This is caused by the cooler air of evening pressing westward upon the heated air of midday; in other words, the lower temperature of the air in the place to the eastward of the sun causes it to press westward upon the rarefied air of the place over which he is vertical." It may be sufficient here to observe, that, if this were granted, it might produce an easterly wind in the evening; but it would also produce one from the west in the morning. In fact, however, the temperature of the surface of the sea, in the places Mr. Main mentions, is not sufficiently affected by the midday sun to produce any such consequences: it is, indeed, scarcely perceptibly raised. The generally received and probably correct explanation is, that the currents of cold air from the poles, spoken of by Mr. Main in his concluding paragraph, reach the equatorial regions without having entirely acquired the equatorial whirling motion. — *A Subscriber. Vale of Alford, Sept.* 28. 1832.

Art. II. *Queries and Answers.*

In twin-born Calves, both are sometimes fertile.—Sir, In answer to the query of U. of Cambridge (p. 396, 397.), " In twin-born calves, is one of the two invariably sterile? And, if the two be male and female, is the sterile one invariably the female?" I beg to state that the female is not invariably sterile, although such an idea is very prevalent. Joseph Holroyd, Esq., of Withers, near Leeds, told me, in July, 1826, when we were conversing upon this subject, that he had a cow which calved twins, a bull calf and a cow calf. As popular opinion was against the cow calf breeding, it being considered a free martin, as described by John Hunter, Mr. Holroyd was determined to make an experiment of them, and *reared them together.* They copulated, and in due time the heifer brought forth a bull calf, and she regularly had calves for six or seven years afterwards.

I would refer your correspondent to John Hunter's *Observations on certain Parts of the Animal Œconomy*, 4to, 2d edition, p. 55., where he will find his paper on the free martin, originally published, I believe, in the *Philosophical Transactions*; and at p. 60. of the same paper, J. Hunter candidly states:—" Although what I have advanced with respect to the production of free martins be in general true, yet, by the assistance of Benj. Wray, Esq., of Denham, near Uxbridge, who knew my anxiety to ascertain this point, I was lately furnished with an instance which proves *that it does not invariably hold good.*" He then goes on to state the case, and the dissection of the animal: —" I have heard of other twin cows breeding; but as I cannot call to mind the names of the individuals who communicated the circumstances to me, I have only mentioned one of undoubted authority. Yours, &c. — *Richard Moulson, M.D. Halifax, Yorkshire, May* 30. 1832.

Moles do swim of choice. (p. 78. 296.) — J. D., at p. 78. 296., asks if moles swim of choice? I answer, yes. Last summer and autumn I visited a river at the bottom of the Botanic Garden, several times very early in the morning and late in the evening, for the purpose of procuring a specimen to preserve of the kingfisher (*A*lcèdo I'spida *L.*), which is frequently to be met with here. One morning as I sat very quietly, I observed a mole come out of an osier holt, and run across a grass path and take to the water; when it was about half across the river, I ran to the edge of the water, and the mole then made a perceptible attempt to dive, but merely immersed his nose in the water for half a minute, and rapidly gained the shore, and soon disappeared in a hole of the bank.

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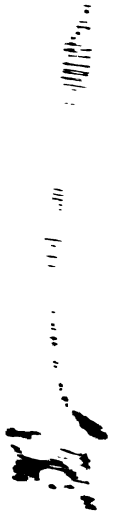

[illegible] of the trachea. [illegible] The young male may [illegible] from the female by its [illegible] The female is also always of the same colour, with precisely the same markings; whereas the young male, though sometimes exactly coloured and marked like the female, has very frequently wandering white feathers, clearly indicating an approach to a change of plumage. I have had repeated opportunities of examining the tracheas of the young males, and have always found them to correspond exactly with the mature bird, and resembling *fig.* 126. The weight of this bird, according to Montagu, is four pounds. *Fig.* 128. represents the trachea of *Mérgus* serràtor *L.* (the red-breasted goosander), the females and young males are also dun divers, but of a smaller size, weighing only about two pounds; but though only about half the size of *Mérgus* Mergánser, its trachea is nearly as large, and has but one enlargement, whilst the labyrinth has two enlargements, instead of one, as in *Mérgus* Mergánser. The female and young are of a duller and heavier colour than *Mérgus* Mergánser, the wing spot is divided by a band, and the neck and head are proportionally much smaller. This, I have no doubt, is the bird of T. K., which he describes, and requests the name of, in p. 397. *Fig.* 127. represents the trachea of *Mérgus* albéllus *L.* (the smew). Rennie, in his edition of Montagu, says, "This is by far the most plentiful species that frequents our coasts, and fresh waters, &c., in the winter." I have myself obtained more of the *Mérgus* Mergánser than of this species. I have never seen a young male of this species marked exactly like the female: but I have had them very nearly alike, and so near as fully to convince me that the young males of all the three species undergo the same change of plumage, from that of the female to the adult male; and that we have, in fact, only three species. The figures are all much reduced. — *Thomas Allis. York,* 27*th of the* 6*th month* (*June*), 1832.

An English Work descriptive of the Genera and Species of British Insects. (p. 686.) — In answer to Tyro (p. 686.), I can only say there is no such work at present published. There is a slight chance (very slight, I hope) of such a work; but no man of honourable feelings will think of buying it, should it be allowed to appear. Professor Rennie has, as most of your readers know, pirated the whole of Mr. Stephens's *Haustellata*, as far as published, and appended thereto a bungling translation of the last parts of the *Lepidóptera Británnica;* but, alas! the sale of his *Conspectus* (a name chosen by the professor from *his dislike of using* Latin words) has been stopped by an injunction from the Court of Chancery; and the professor's books will, I trust, rot on the bookseller's shelves. —*E. Doubleday. Epping, Sept.* 29. 1832.

Polyómmatus Argìolus double-brooded. (p. 496.) — I have observed it to be double-brooded, and believe it to be generally deemed so. Without referring to my observations made upon this species during seasons now past, perhaps those of the present year may suffice. The first brood I observed was at Kensington, and appeared about the 20th of April; and the second brood, which was more abundant, I saw at Old Oak Common, near Wilsden, during the first week in July. It was remarkable that when the first brood was found at Kensington there were none at Wilsden; and that when they had appeared at Wilsden there were none at Kensington. This circumstance may strengthen the conjecture of Mr. Bree (Vol. IV. p. 478.), " that in one place it appears only in the spring, and in another only in the summer." As to this singular occurrence, my idea is, that perhaps the circumstance of the first brood having, while in the larva, or the perfect state, somewhat exhausted the necessary supply of food, actuates the butterfly to roam in search of some new and more productive place where it lays its eggs, and where the insects produced from them may range in the midst of abundance. As to the length of time they are in season, I captured three solitary specimens on the 2d of this month at the above common, and since then, by the kindness of a friend, I have received one captured at Brighton on the 9th of this month. — *James Fennell. Sept.* 1832.

Polyómmatus Argìolus double-brooded. (Vol. IV. p. 477. 558.) — I took this insect in considerable numbers on the coast of Dorset, in August, 1831, in all its freshness and beauty, and have also taken it in April and May, 1832, in Somerset. On July 12. 1832, also, on and near the lower part of a considerable hill (Roundway), near Devizes, I took several specimens, but rejected them from their worn out and imperfect condition. The first brood of the year, I therefore conclude, will soon disappear. — *Albert. July* 12. 1832.

Microgáster glomeràtus does not " confine itself to one Species of Moth or Butterfly" (p. 106. note, 495.), as several of these ichneumons came out of the pupæ of a brood of Abráxas grossularìata, which I had kept in a breeding box this summer. — *M. P. Sept.* 11. 1832.

The Cultivation of Vícia sylvática. — I was rather surprised to find the query of W. T. Bree (Vol. V. p. 198.), as to the difficulty of cultivating the *V*ícia sylvática. It grows in thousands, perhaps tens of thousands, on Hort's Hill, Hey's Wood, just ten miles from Coventry, festooning the underwood with its beautiful chocolate-striped petals most delightfully. It is a sight well worth walking miles to see. In a garden in that village, this plant and the crimson grass vetch (*Láthyrus* Nissòl*ia* L.), found wild in that neighbourhood, have been cultivated for many years without any difficulty, and there is always an abundance of self-sown plants. — *Aliquis. Manchester, March* 21. 1832.

Instruments for facilitating E. H. G.'s Meteorological Studies. (p. 688.) — He will want a night and day thermometer, with a register or index. Each of these may be had separate (for about 7*s.* or 7*s.* 6*d.* each), or both may be procured on one frame, with, I believe, in that case, steel indices; but the best instrument is Six's night and day register thermometer, price, at Cary's (181. Strand), 1*l.* 16*s.* This requires a magnet, to adjust, daily, each index, which will cost 2*s.* 6*d.* It is requisite, also, to have a pluviometer or rain gauge, which any tinman could make him, of tin, or copper tinned: the form is not material, provided the receiver be of precisely the same size, throughout its whole depth, as the receiving surface. My own consists of a funnel (*fig.* 129. *a*), 3 in. square, fixed upon the reservoir (*b*), by soldering. Through the neck of this is inserted a graduated stem (*c*), terminating in the cork ball (*d*), which floats upon the surface of the water, the stem marking in fractions of inches the depth of rain fallen; and, lastly, a stopcock (*e*), to let off the water once a month, or oftener, as required. A single night register thermometer is useful as a check upon the double (or Six's). It would be desirable to add a hygrometric column to the calendar; and, for this purpose, Mr. Daniell's would be the most delicate, and probably most accurate, hygrometer: the price I do not know; but the instrument is described in Mr. Daniell's *Meteorological Essays and Observations*, price, I think, 1*l.* 1*s.* The velocities of the wind, as well as its direction, might also be added; but I do not know an anemometer sufficiently simple to give an accurate idea by a hasty glance merely. — *Sigma. Saffron Walden, Sept.* 25. 1832.

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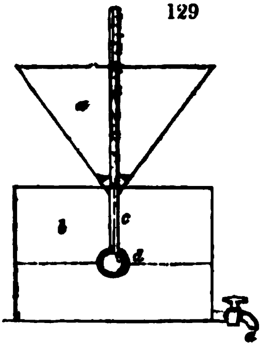

Two formularies for an anemometer are described in the *Gardener's Magazine*, vol. vii. p. 231. 618. — *J. D.*

The Transit of Mercury observed in London. — Mr. Dovaston asks (p. 504.) where the transit of Mercury was observed. I reside in the vicinity of the Tower of London, and have not the means of "hoisting an old Galileo, or of using a long Sidrophel;" but, with a Gregorian reflector of 4 ft., I observed the transit several times between the hours of ten and eleven A.M., and I twice caught a glimpse of it between the hours of one and two P.M. These were the only two periods in which it was visible in this quarter, as I continued patiently watching the whole of the time. — *R. J. M. Sept.* 4. 1832.

The Transit of Mercury seen at Colchester. — At half past nine, five minutes before ten, at eleven, and at twenty minutes before twelve o'clock, forenoon, the planet was distinctly seen, like a circular black spot crossing the sun's disc. — *George Scott. Observatory, Colchester, May* 6. 1832.

The Transit of Mercury was observed in Ireland, at the observatory of Trinity College, Dublin, by Professor Hamilton, and also at that of Mr. Sharp, a watchmaker, in Dublin. There was no observation taken at Armagh, owing to the cloudiness of the day. — *T. K. Killaloe, Sept.* 21. 1832.

Anchor Frosts (Vol. V. p. 91. 303. 395.). — Sir, I perceive that others besides myself have endeavoured to account for anchor frosts. Mr. Carr (p. 395.) says that they never occur except in long and severe frosts; and that the adhesion of the ice to the stones at the bottom is owing to their acquiring a degree of cold far below the freezing point. He is in error when he says that they never occur except in long-continued frosts, as the walls of ice, which are sometimes raised on the crowns of weirs, are invariably (as far as my observations have extended) deposited there *before* the water in the reservoir above is frozen over: which proves that the frost has not been of long continuance, although it may have been severe. As to what he says about the stones acquiring a degree of cold far below the freezing point, and imparting that coldness to the water, I would just ask how it is that a stone at the bottom of a river acquires this excess of cold. and if it is not more probable that the stones impart warmth to the surrounding water. I can easily conceive how the stones may, by the action of the sun's rays upon them, warm the surrounding water; but I do not see how they can impart cold, or, in other words, how their temperature can be reduced below that of the water by which they are surrounded. Stones, certainly, impart warmth to the water they are in, in bright weather, as the rays of the sun do not impart much of their warmth in passing through any transparent medium; but, on coming in contact with any opaque bodies, the heat is absorbed or reflected, as the case may be: and in this way transparent media, such as air and water, acquire a warmth by contact which they would not otherwise possess. Thus, if an anchor frost is followed by a bright day, the rays of the sun impart so much warmth to the stones at the bottom of the river as is sufficient to liberate the ice from them; and, on such days, thousands of pieces of the ice may be seen floating down the streams. Since my former observations (p. 303.) were written, I have had the satisfaction of finding my view of the subject confirmed by a very eminent chemist; and if the discussions in your Magazine were to be settled by authority, and not by argument (which, I trust, will never be the case), he is one to whom many would be inclined to appeal, and to whom few would refuse to submit. I am, Sir, yours, &c. — *T. G. Clitheroe, Lancashire, May* 2. 1832.

In J. M.'s communication on this subject, p. 395. line 35., for (the Thames always freezes) " just at the bottom," read " first at the bottom." — *J. D.*

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